

KIC 004996057

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
004996057-02	OBS	7712.01	4.830309	134.956073	21.2	7.647	7.4	7.6	2.25	5086	1.25	1055.61
004996057-03	OBS	No	616.235786	334.159499	140.7	19.705	10.9	8.0	2.25	5086	3.02	1.64

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004996057-02	OBS	PC	0.79	0	0	0	0	CENT_KIC_POS
004996057-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

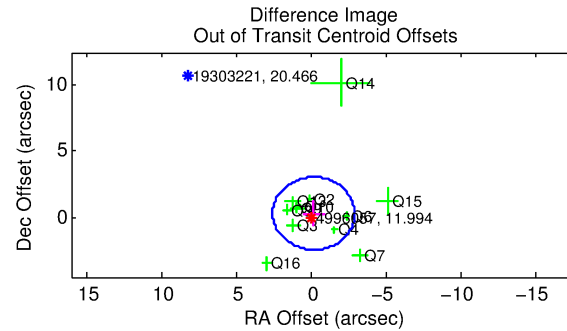
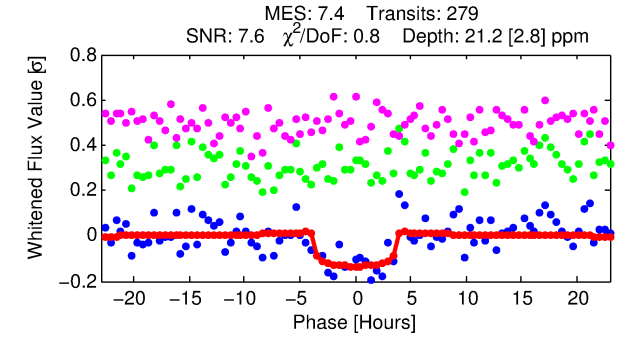
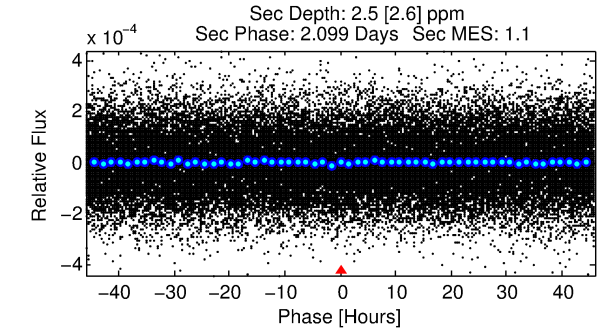
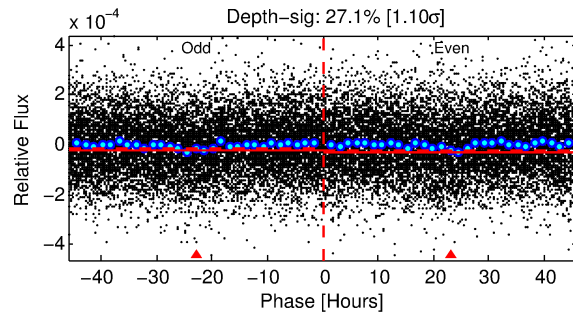
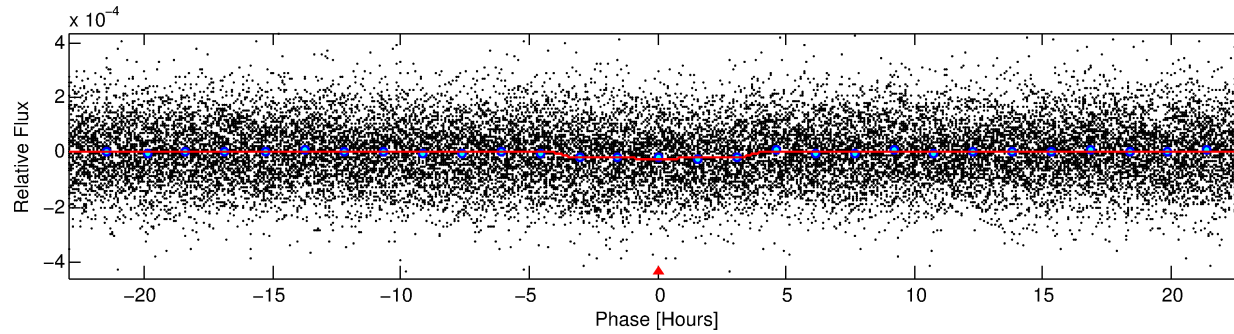
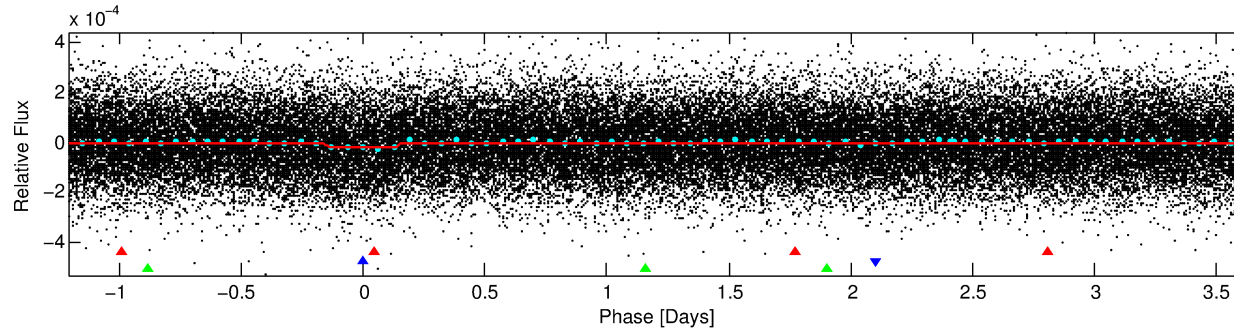
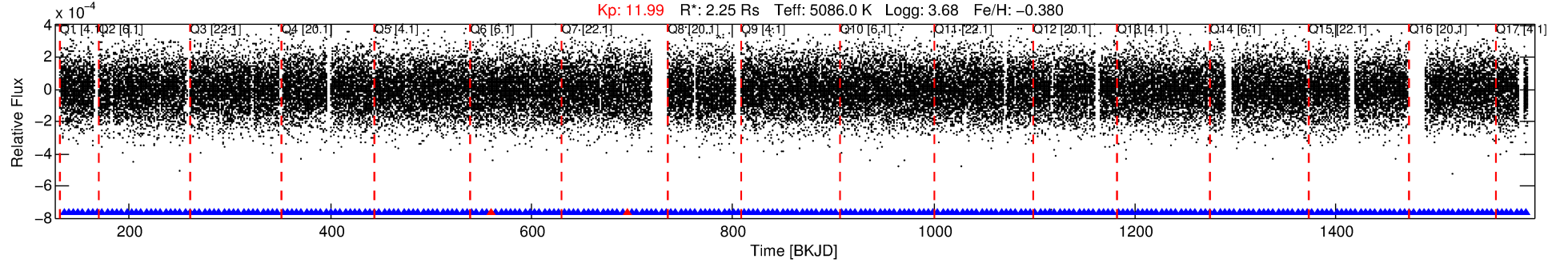
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004996057-02

No Significant Match Found

DV One-Page Summary

KIC: 4996057 Candidate: 2 of 3 Period: 4.830 d



DV Fit Results:

Period = 4.83031 [0.00007] d
Epoch = 134.9561 [0.0099] BKJD
Rp/R* = 0.0051 [0.0020]
a/R* = 2.34 [3.22]
b = 0.90 [0.36]
Seff = 1055.61 [434.50]
Teq = 1453 [150] K
Rp = 1.25 [0.66] Re
a = 0.0535 [0.0154] AU
Ag = 2.55 [3.46] [0.45 σ]
Teffp = 2840 [922] K [1.48 σ]

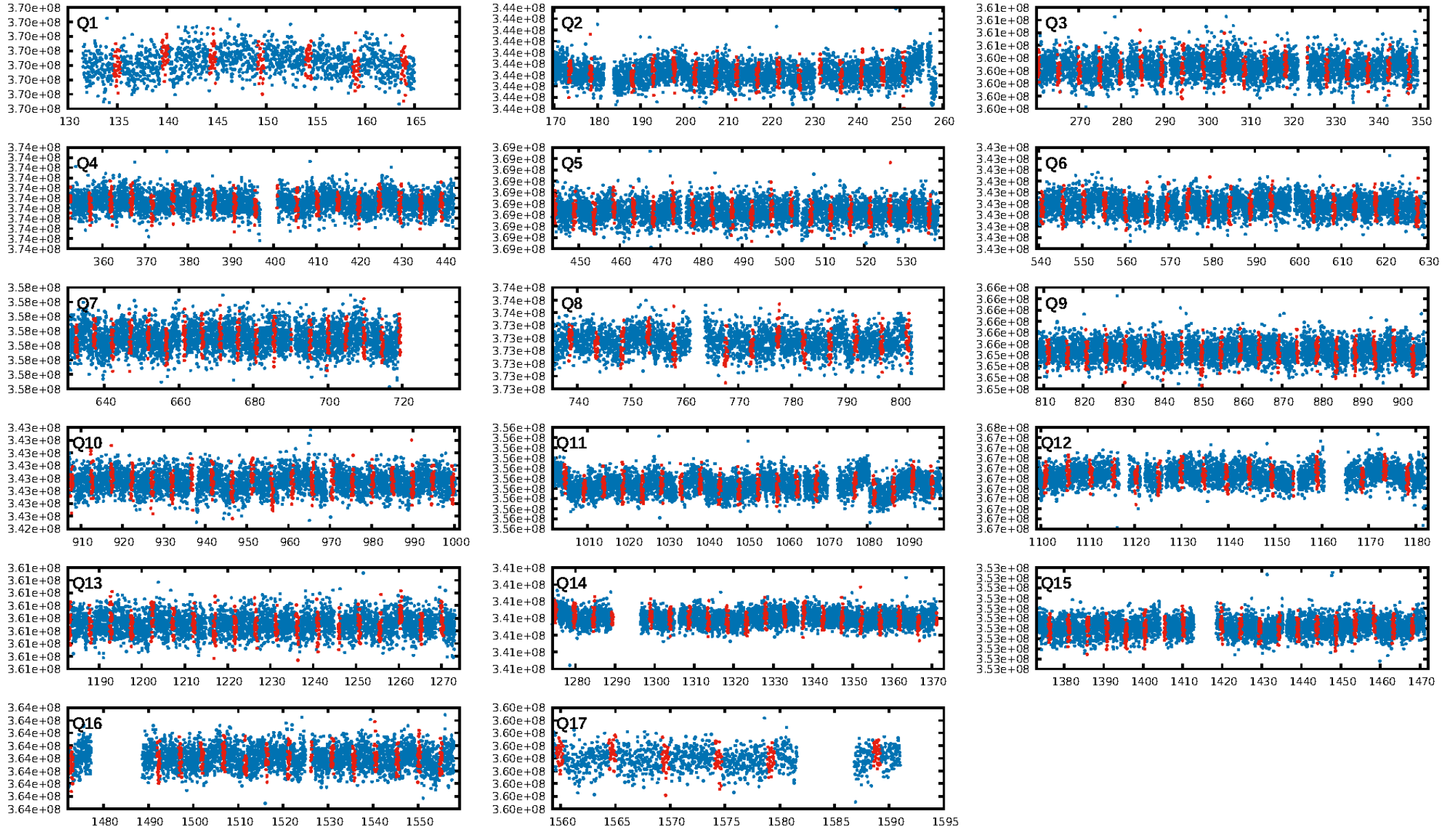
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [751.88 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.41e-12
RollingBand-fgt: 0.99 [264/266]
GhostDiagnostic-chr: 0.6335
Centroid-sig: 2.3%
Centroid-so: 1.489 arcsec [1.76 σ]
OotOffset-rm: 0.364 arcsec [0.40 σ]
KicOffset-rm: 0.396 arcsec [0.57 σ]
OotOffset-st: 4/3/2 [12]
KicOffset-st: 4/3/2 [12]
DiffImageQuality-fgm: 0.67 [8/12]
DiffImageOverlap-fno: 1.00 [17/17]

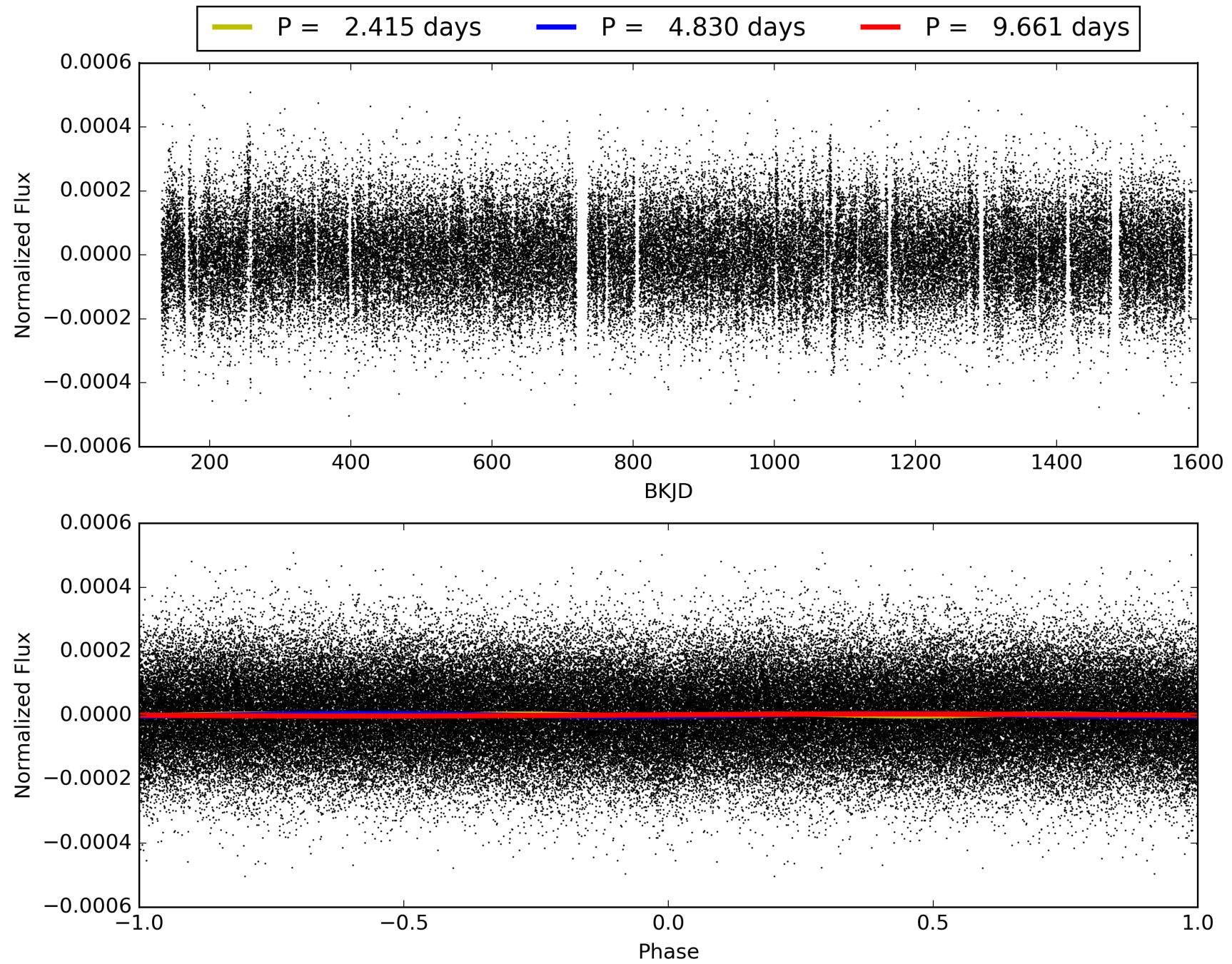
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:22:32 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004996057-02, PDC Light Curves

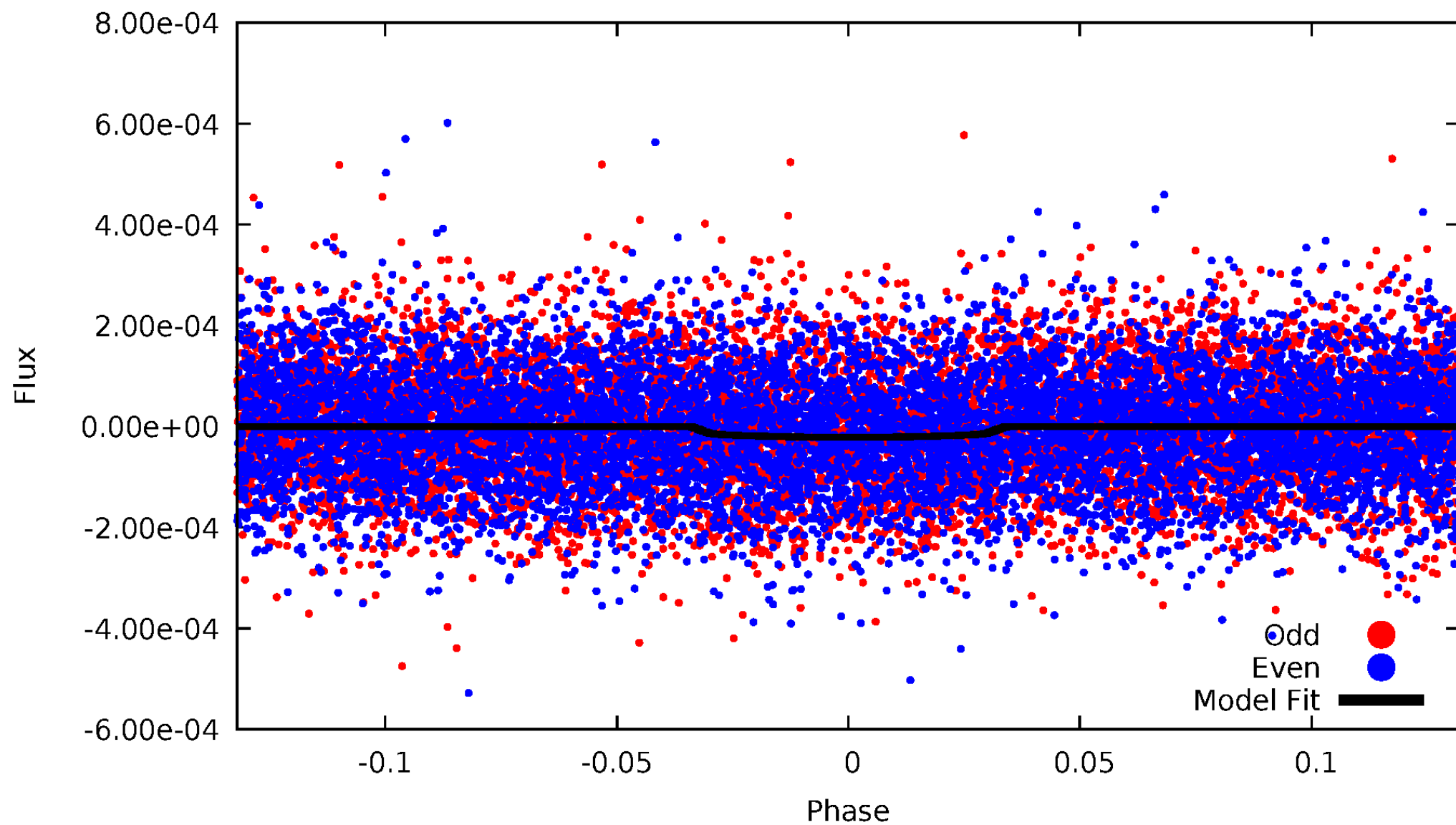


TCE 004996057-02



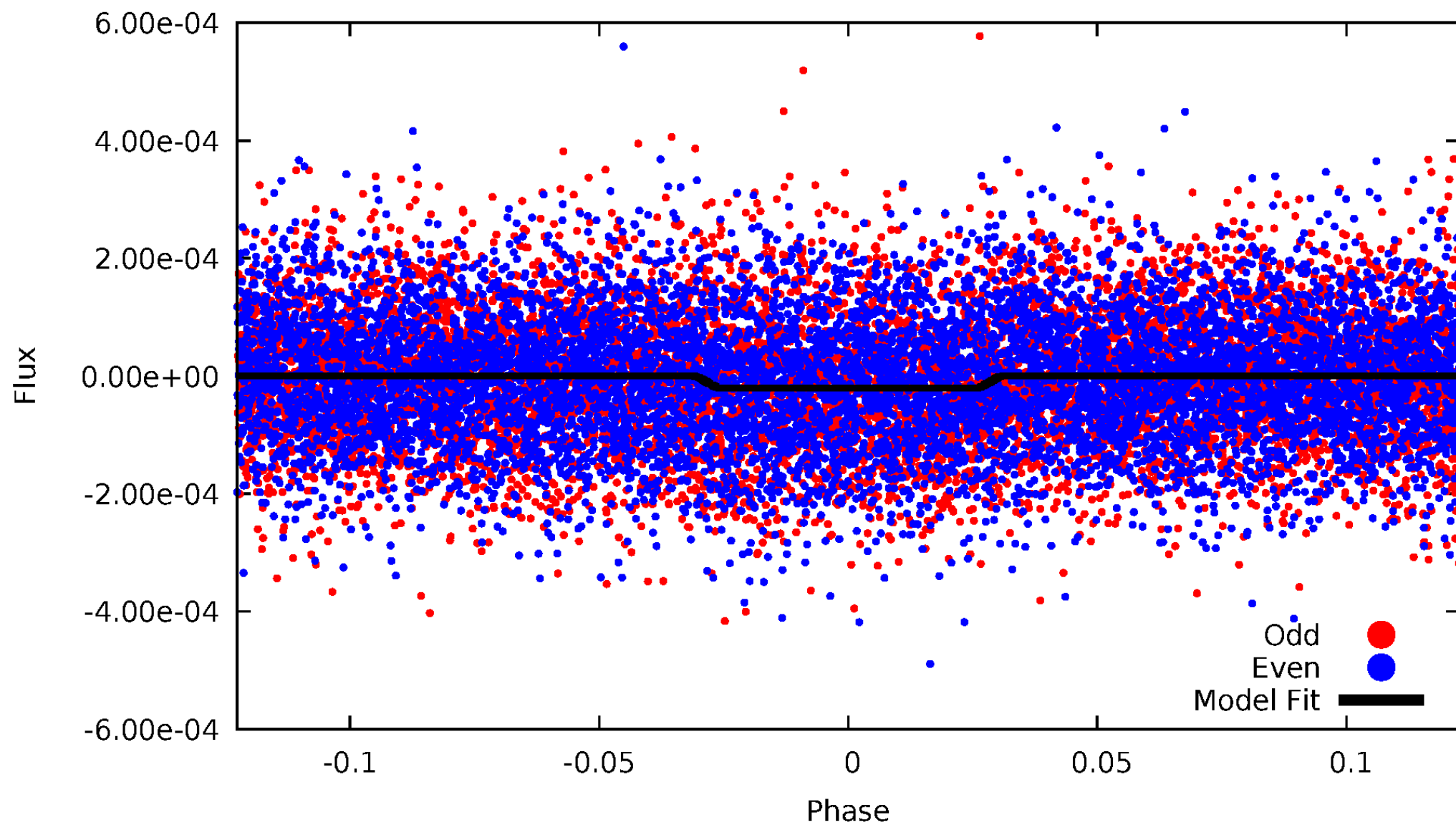
DV Odd/Even

TCE 004996057-02



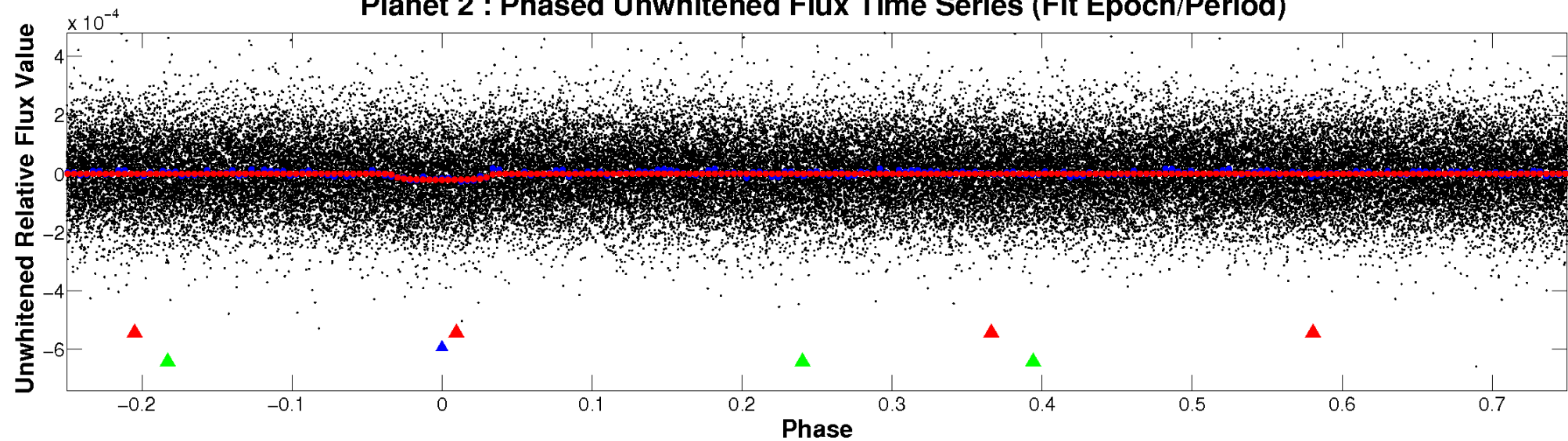
ALT Odd/Even

TCE 004996057-02

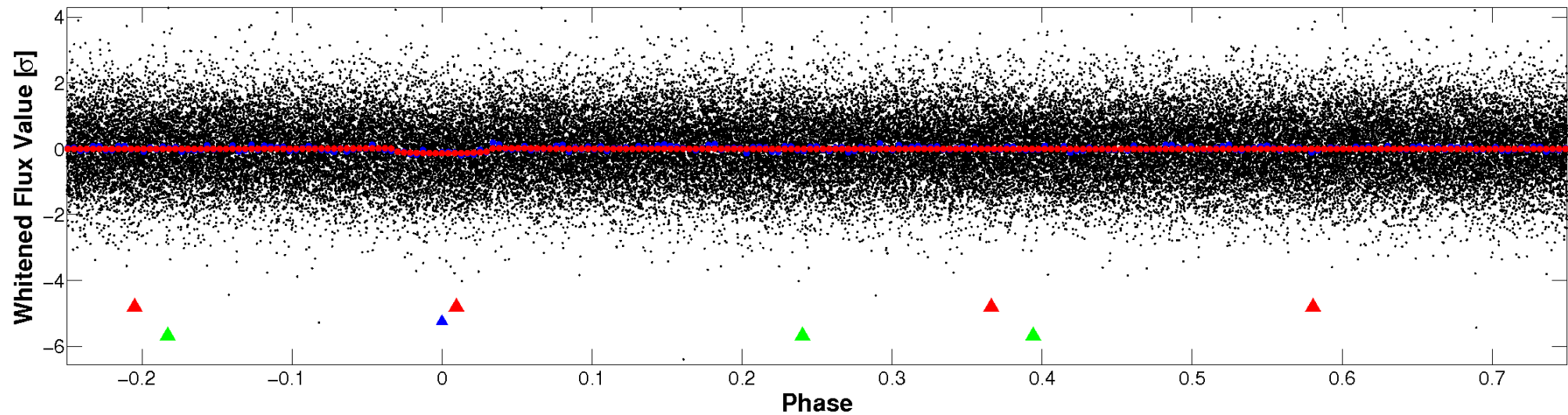


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

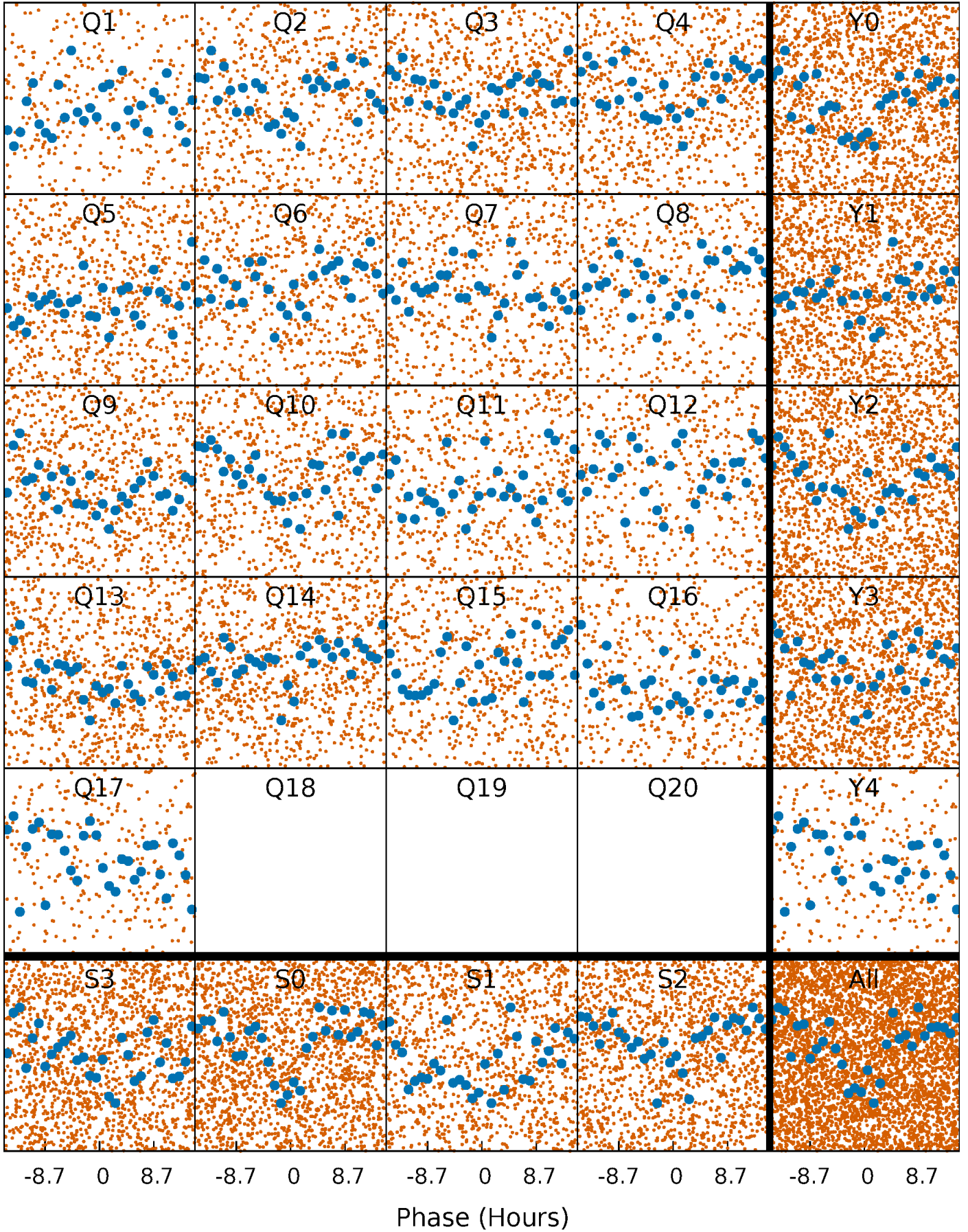


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



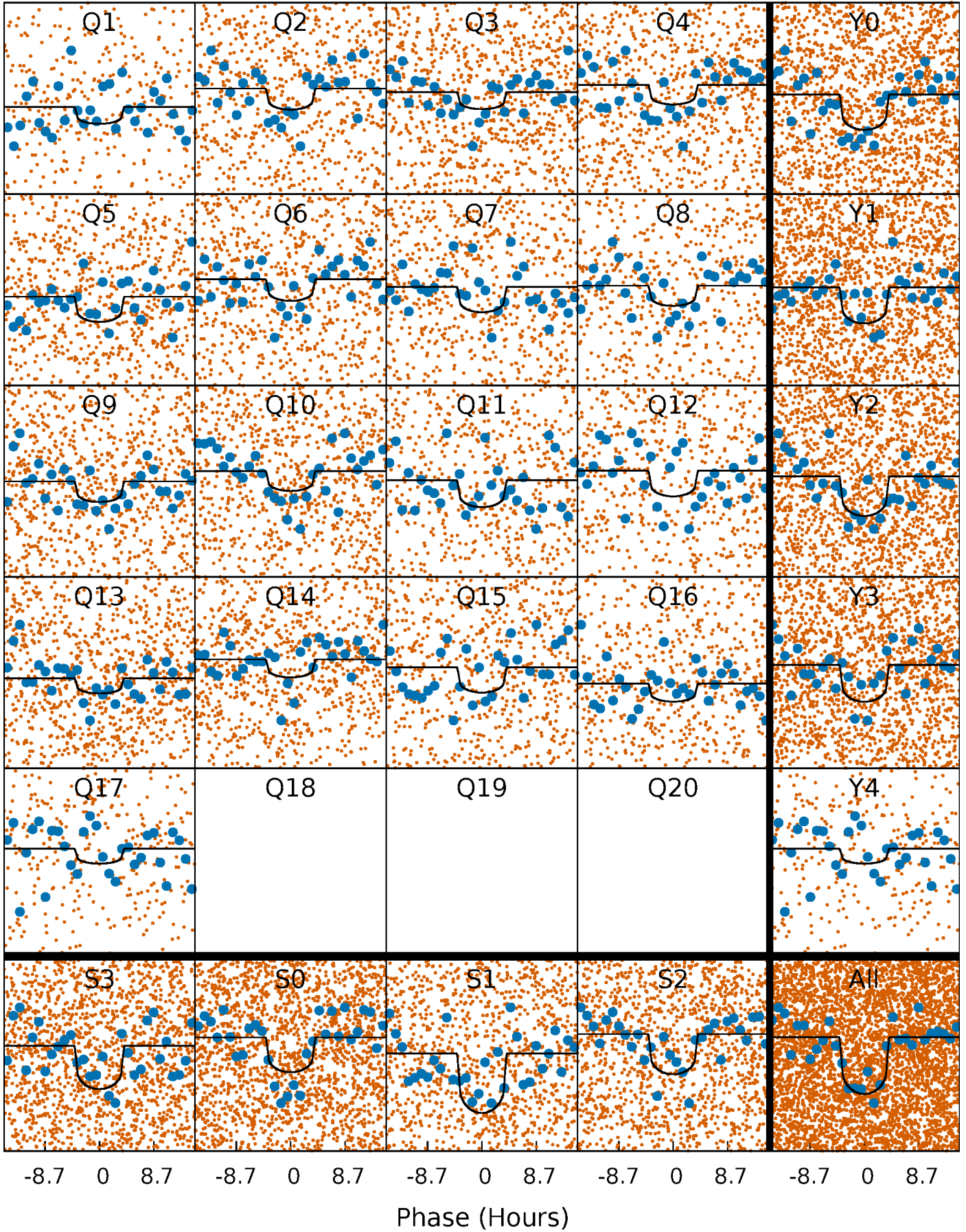
PDC Quarter-Phased Transit Curves

TCE 004996057-02 P= 4.830309 Days $T_0=134.956073$ (BKJD)



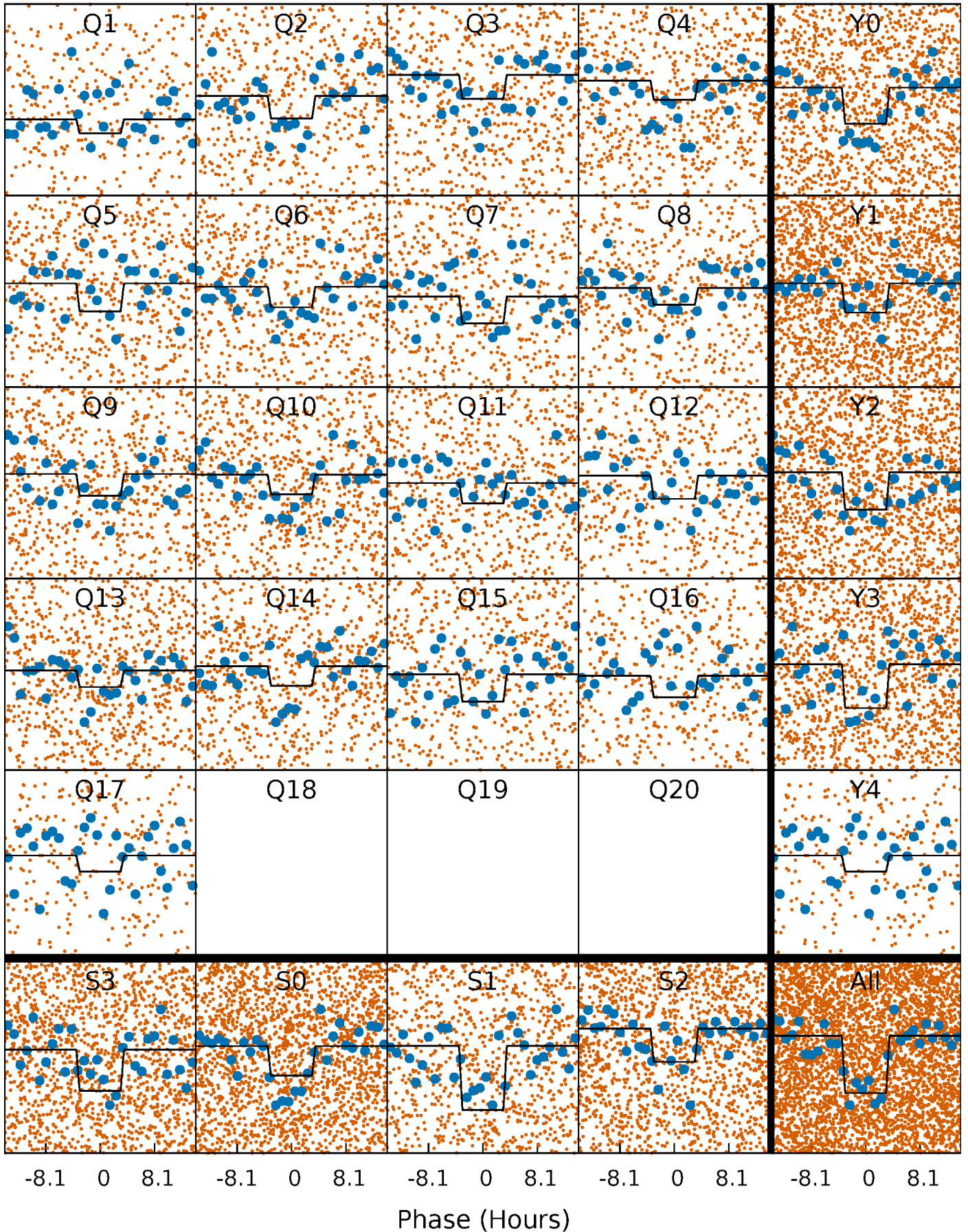
DV Quarter-Phased Transit Curves

TCE 004996057-02 $P = 4.830309$ Days $T_0 = 134.956073$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

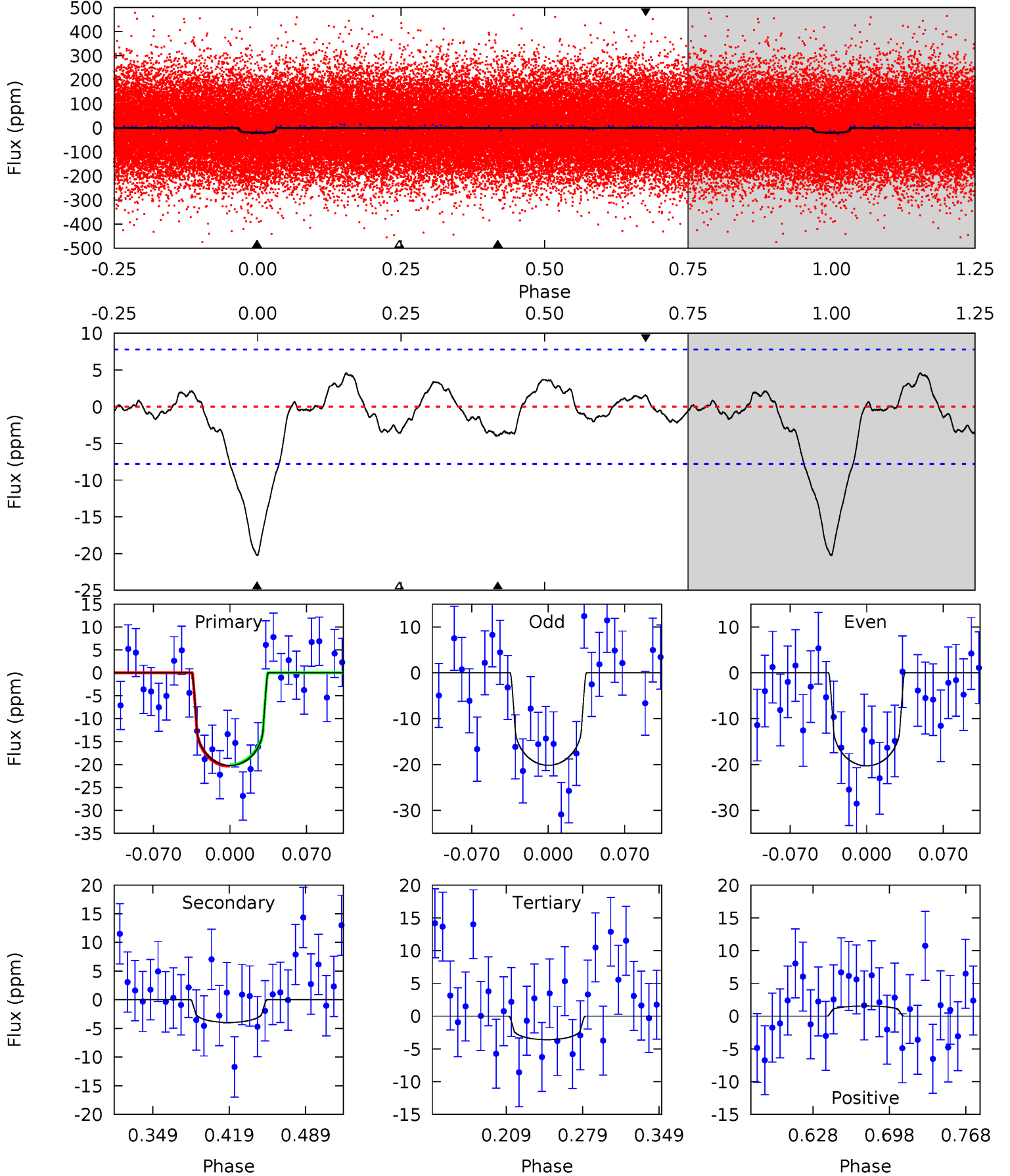
TCE 004996057-02 P= 4.830446 Days $T_0=134.938189$ (BKJD)



DV Model-Shift Uniqueness Test

004996057-02, P = 4.830309 Days, E = 130.125764 Days

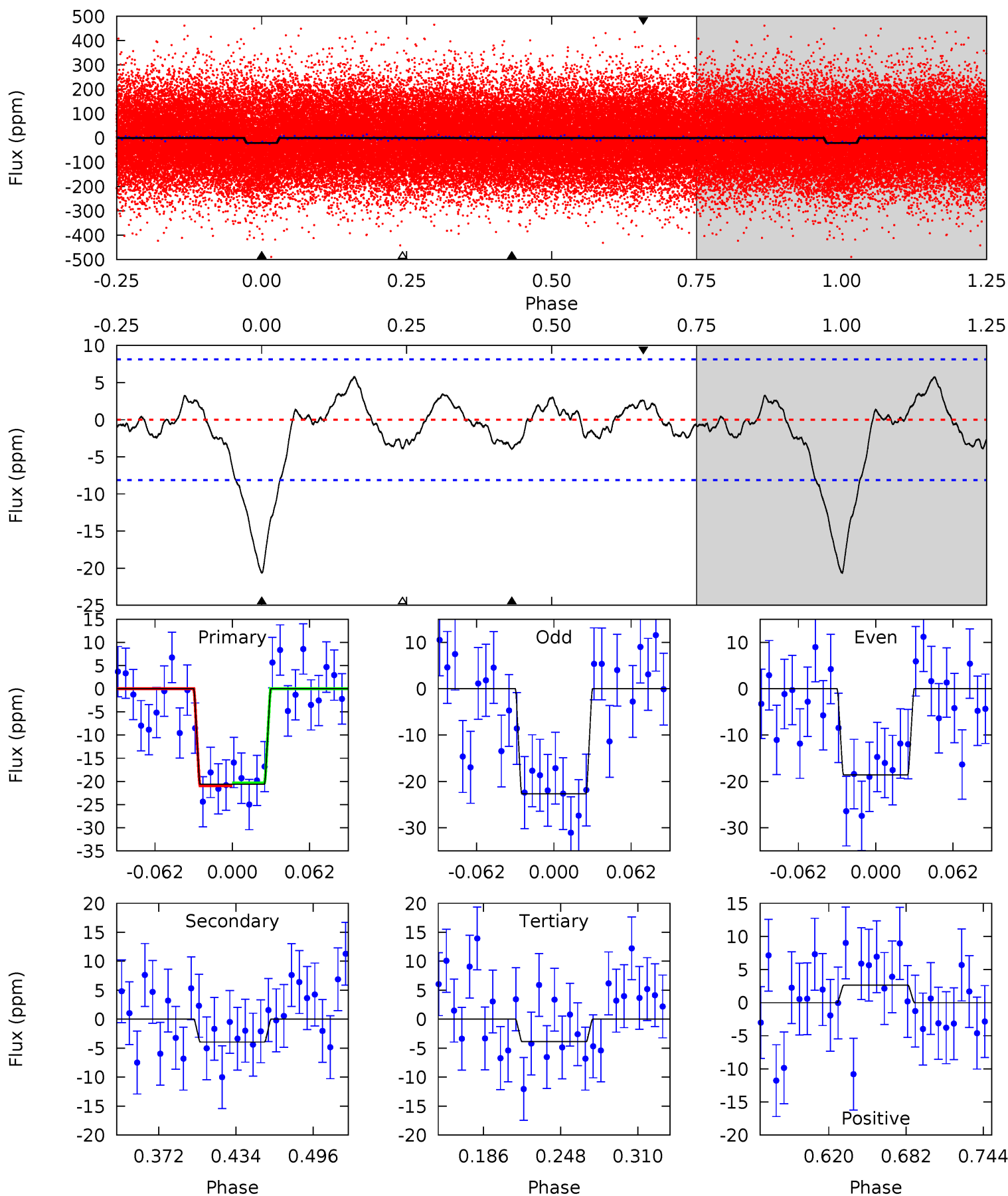
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	2.36	2.14	0.92	4.64	1.81	1.15	9.89	11.1	0.22	1.44	0.03	1.11	0.18	0.08



Alt Model-Shift Uniqueness Test

004996057-02, P = 4.830446 Days, E = 130.107743 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.8	2.26	2.22	1.51	4.66	1.87	1.17	9.60	10.3	0.04	0.75	1.19	0.85	0.22	0.19



Stellar Parameters For KIC 004996057

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5086^{+129}_{-103}	$3.678^{+0.128}_{-0.208}$	$-0.380^{+0.300}_{-0.150}$	$2.247^{+0.806}_{-0.269}$	$0.877^{+0.258}_{-0.030}$	$0.109^{+0.055}_{-0.057}$
	+3%/-2%	+3%/-6%	+79%/-39%	+36%/-12%	+29%/-3%	+50%/-53%
Source	PHO1	FLK73	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 004996057-02 / KOI 7712.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-4 ± 2	$1.33^{+0.52}_{-0.48}$	2047^{+167}_{-108}	3493^{+662}_{-509}	$3.543^{+5.404}_{-2.156}$
Alt.	-4 ± 2	$1.14^{+0.57}_{-0.46}$	2036^{+180}_{-99}	3679^{+849}_{-534}	$4.624^{+9.701}_{-2.837}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

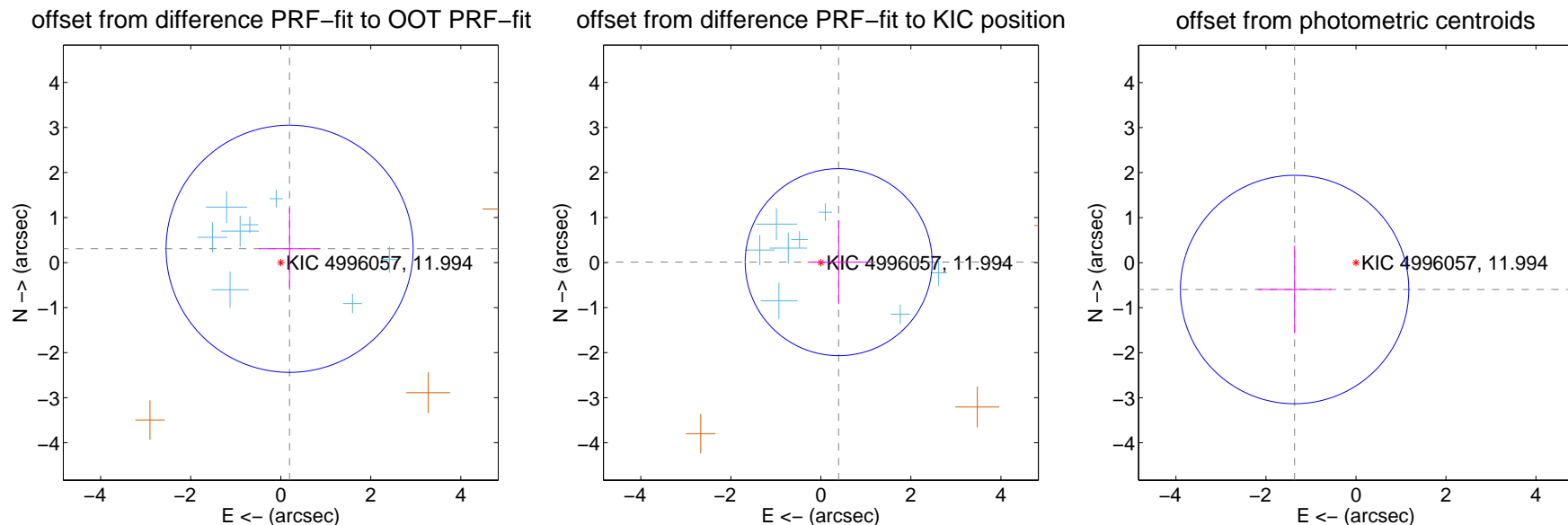
DV Centroid Data

Supplemental centroid analysis for 004996057-02. **Kepler magnitude: 11.99.** Transit SNR 7.59

There are 8 quarters with good PRF difference image offsets

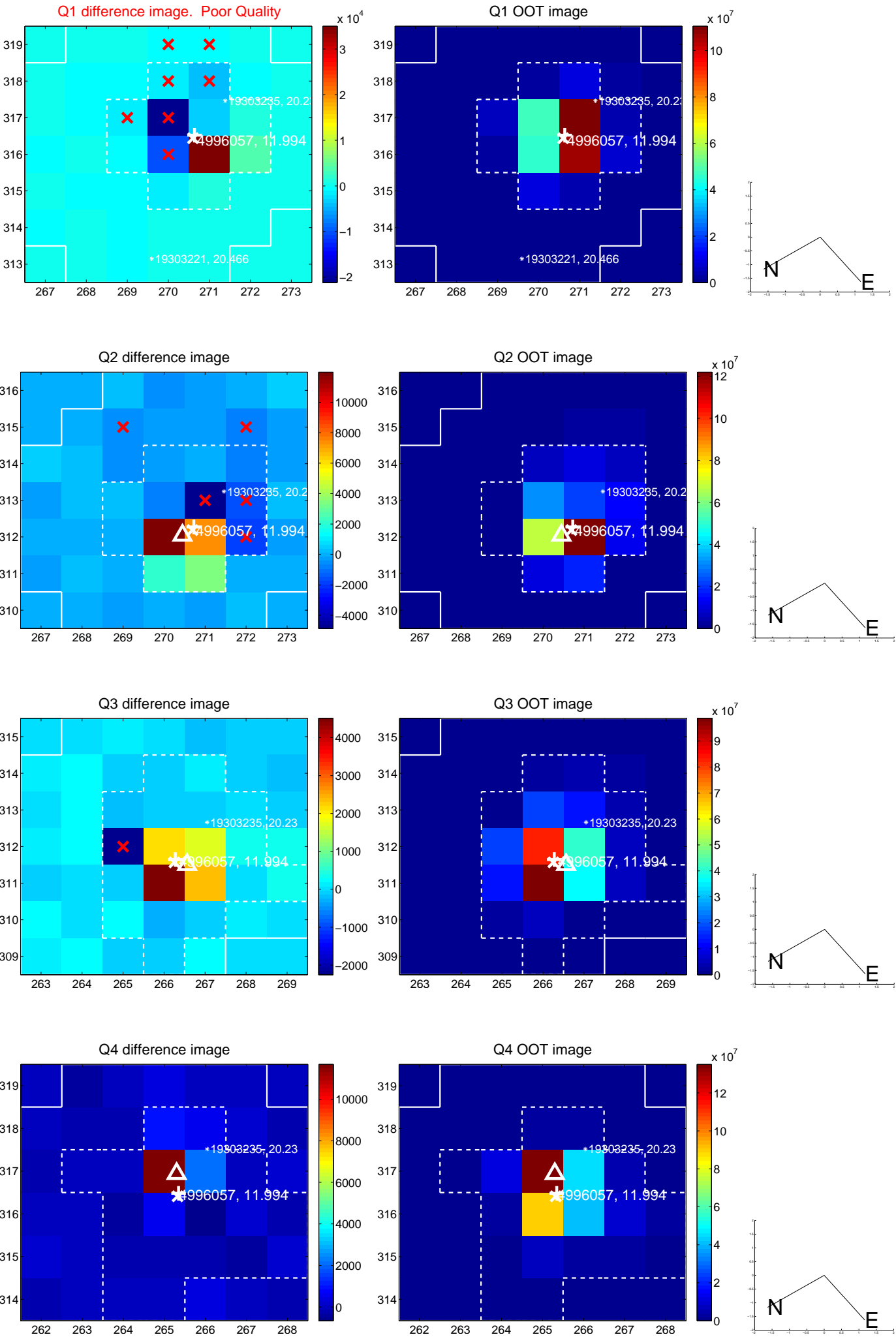
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.364 ± 0.915	0.40	-0.196 ± 0.681	0.307 ± 0.906
PRF-fit source offset from KIC position	0.396 ± 0.692	0.57	-0.395 ± 0.688	0.010 ± 0.931
photometric centroid source offset	1.49 ± 0.85	1.76	1.36 ± 0.82	-0.60 ± 0.97

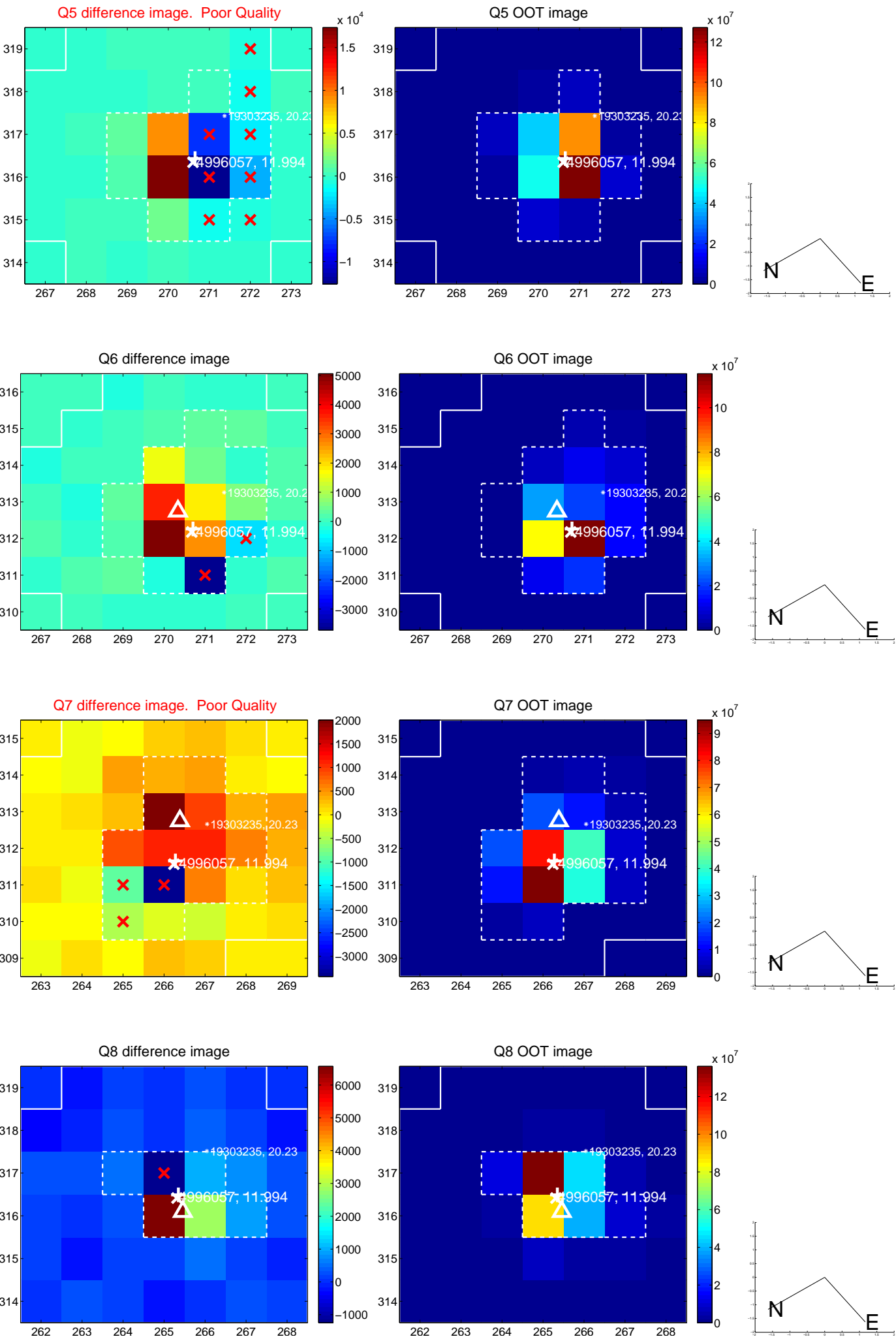


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

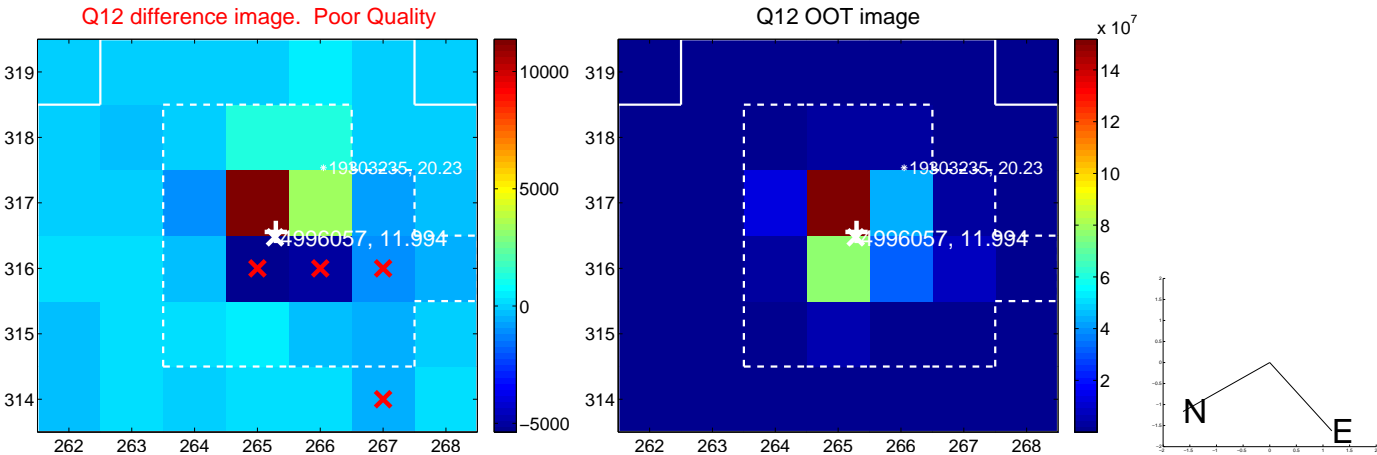
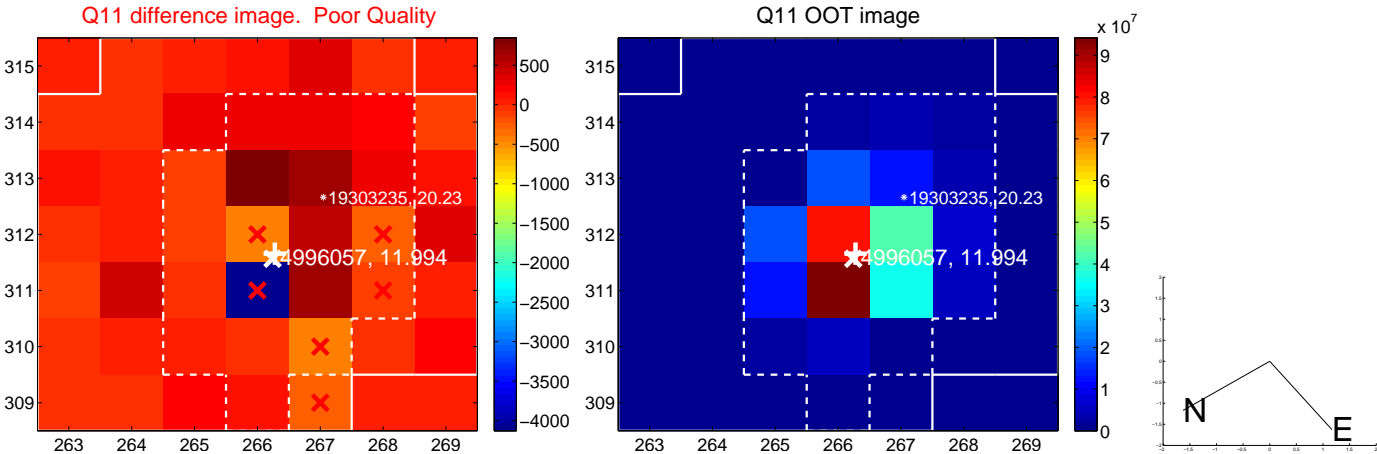
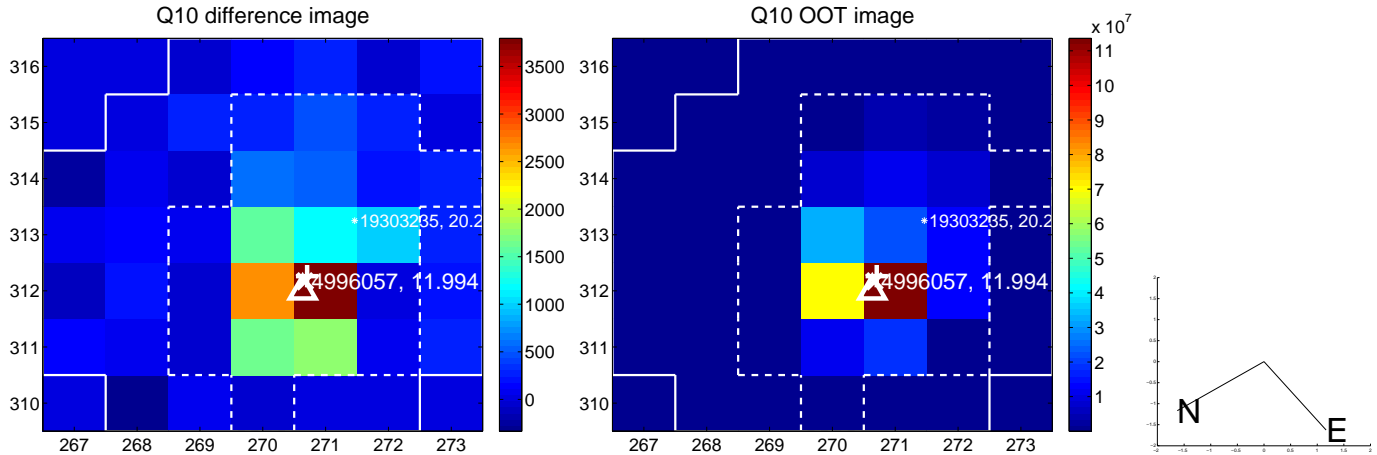
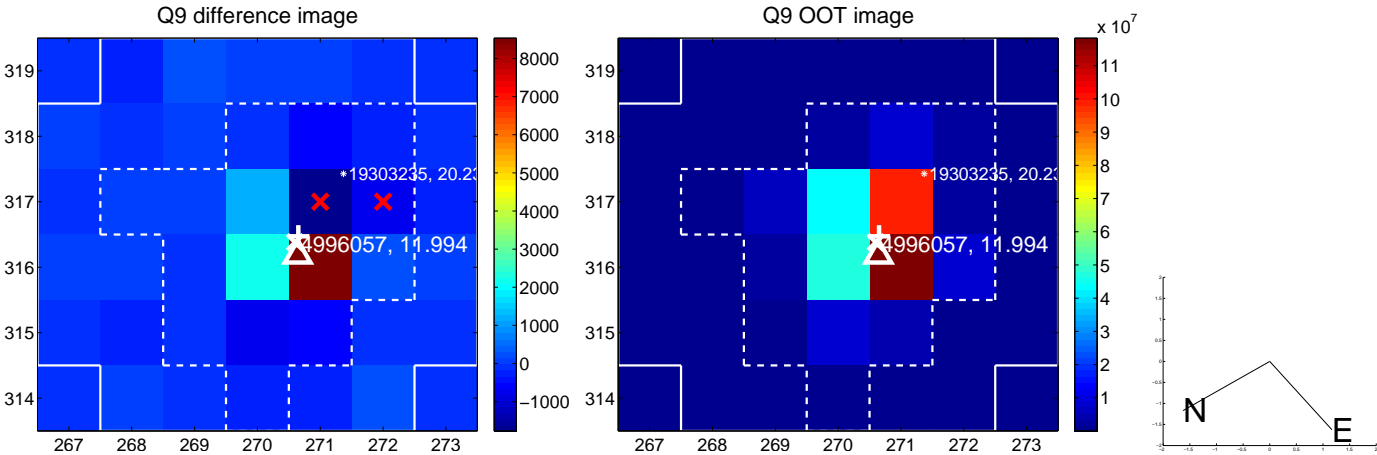
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



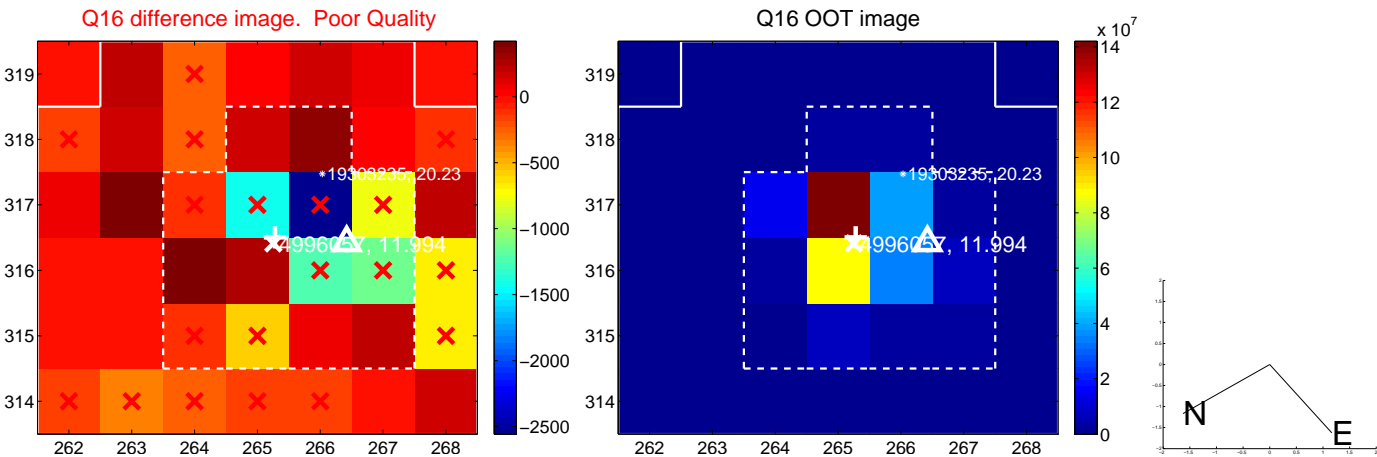
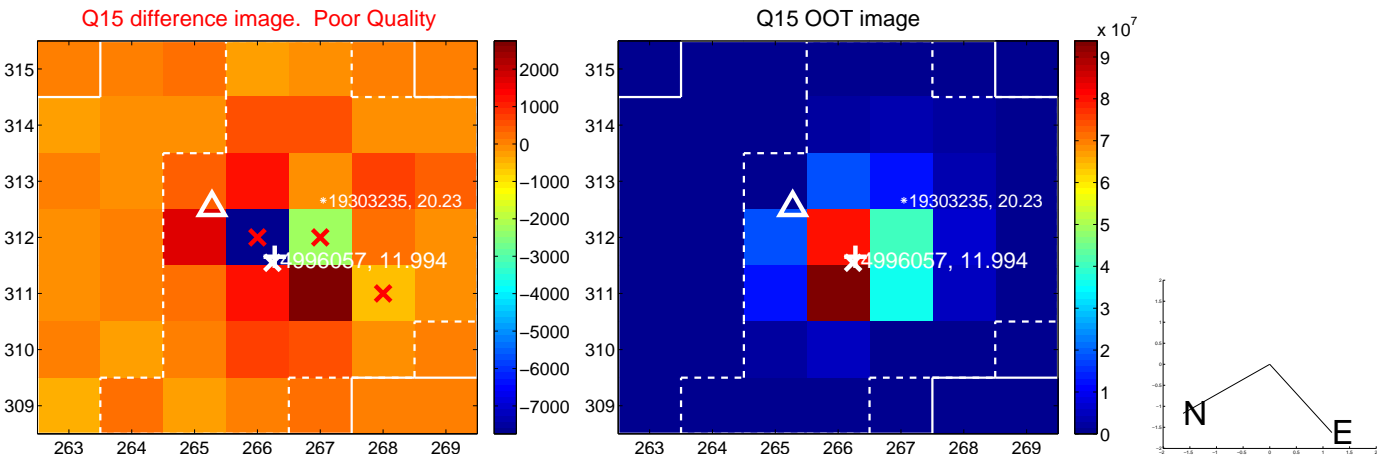
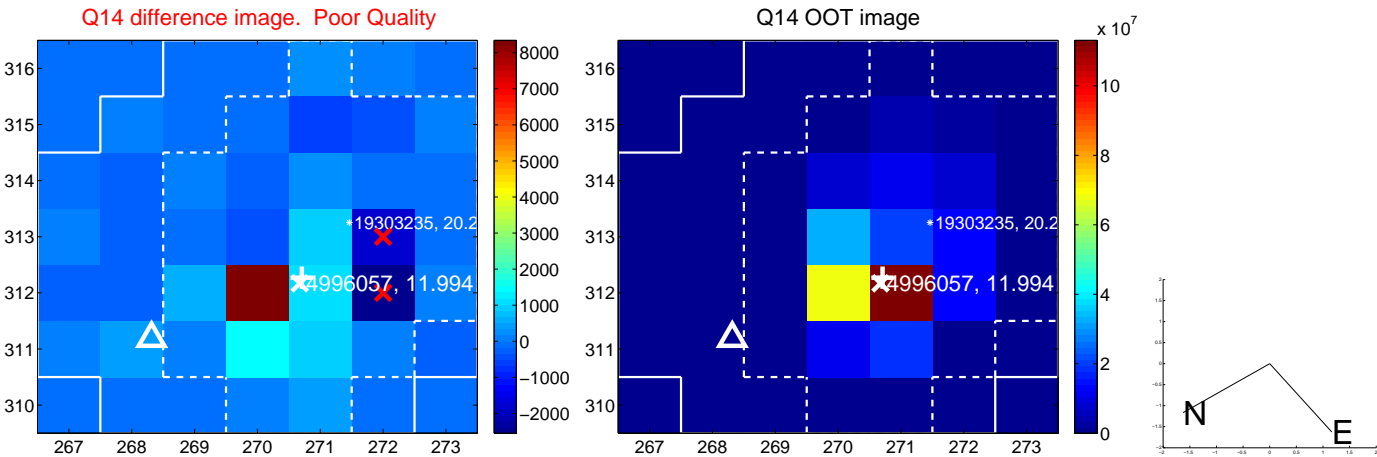
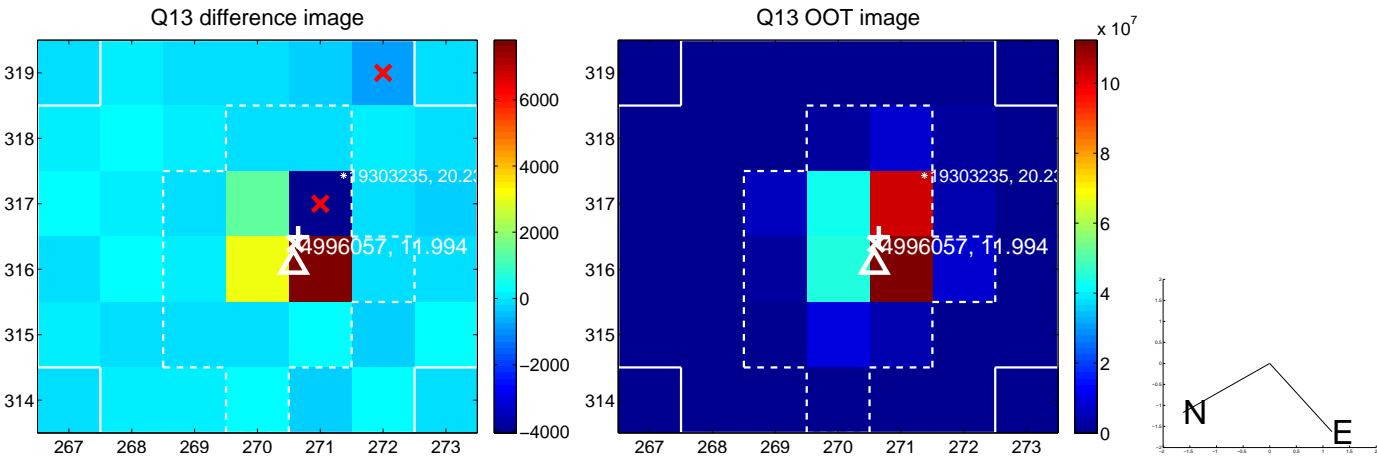
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



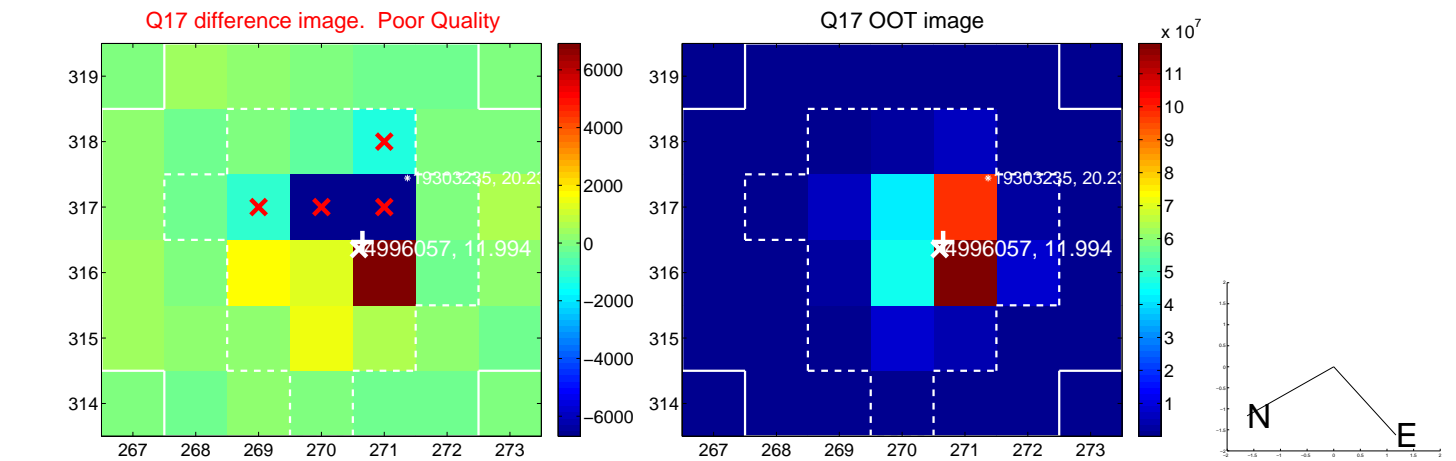
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



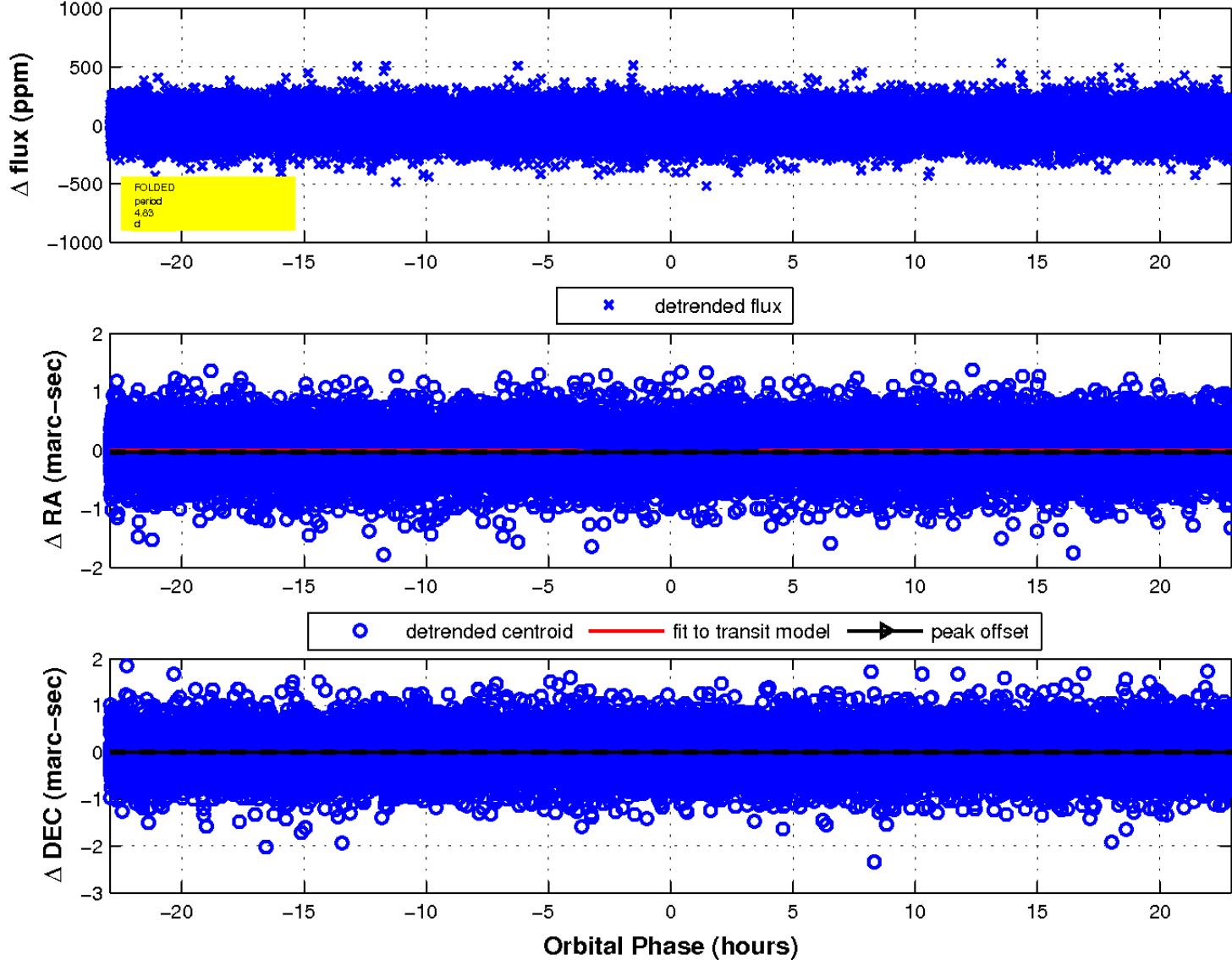
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

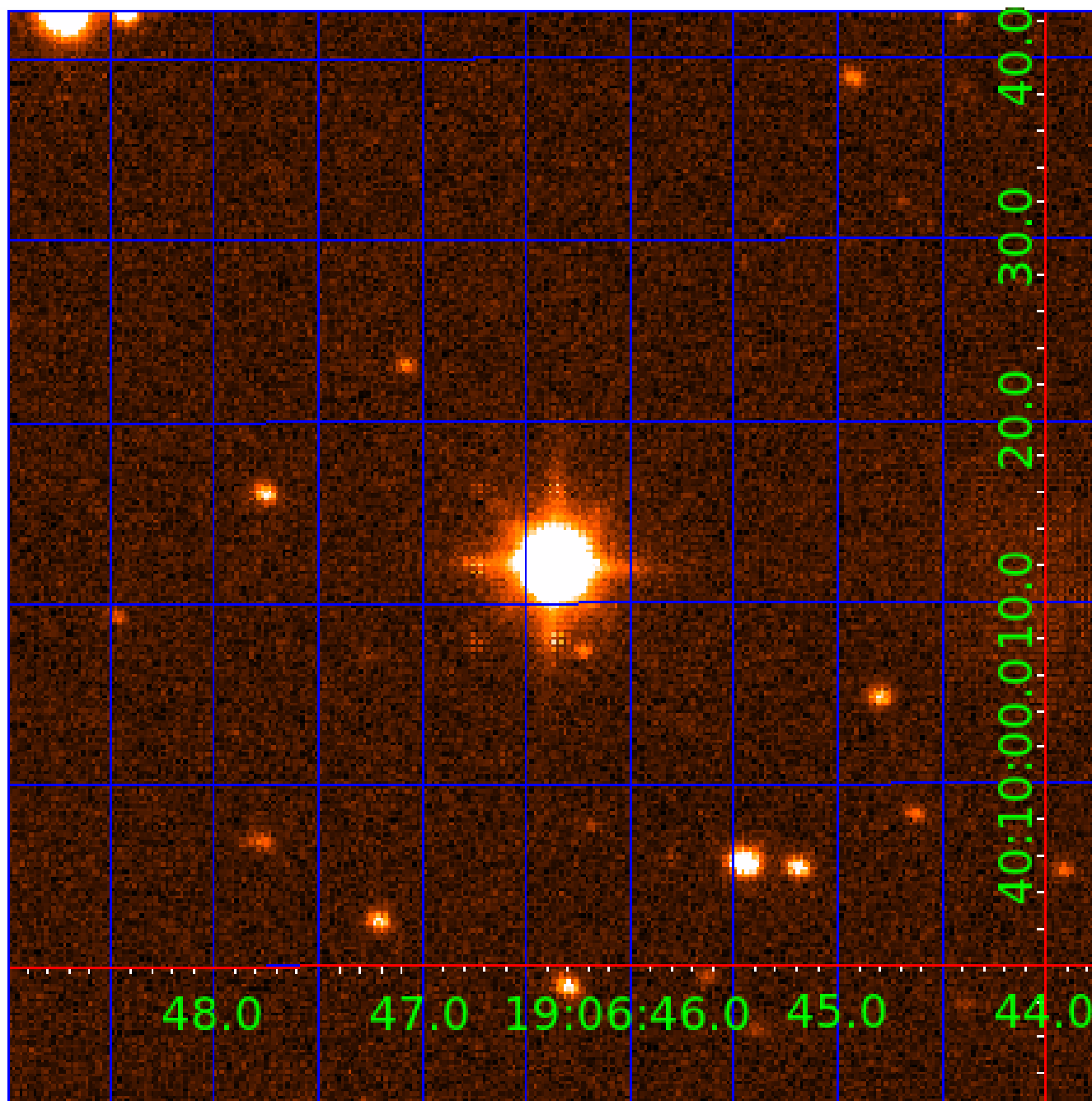


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



KIC 004996057

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
004996057-02	OBS	7712.01	4.830309	134.956073	21.2	7.647	7.4	7.6	2.25	5086	1.25	1055.61
004996057-03	OBS	No	616.235786	334.159499	140.7	19.705	10.9	8.0	2.25	5086	3.02	1.64

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004996057-02	OBS	PC	0.79	0	0	0	0	CENT_KIC_POS
004996057-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

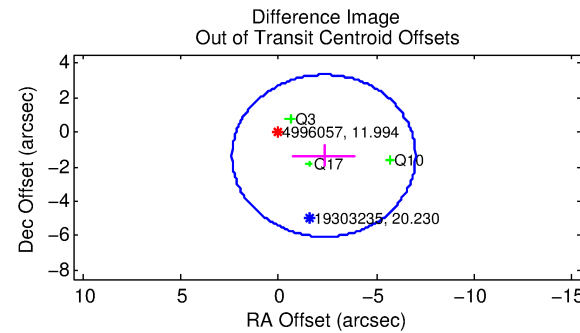
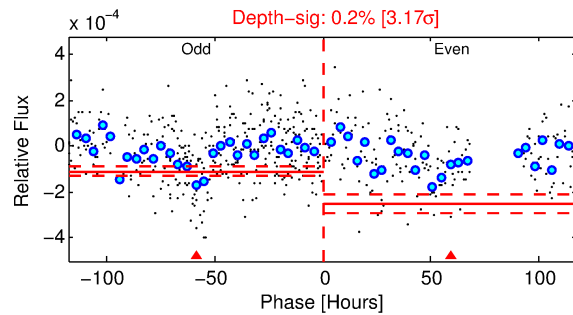
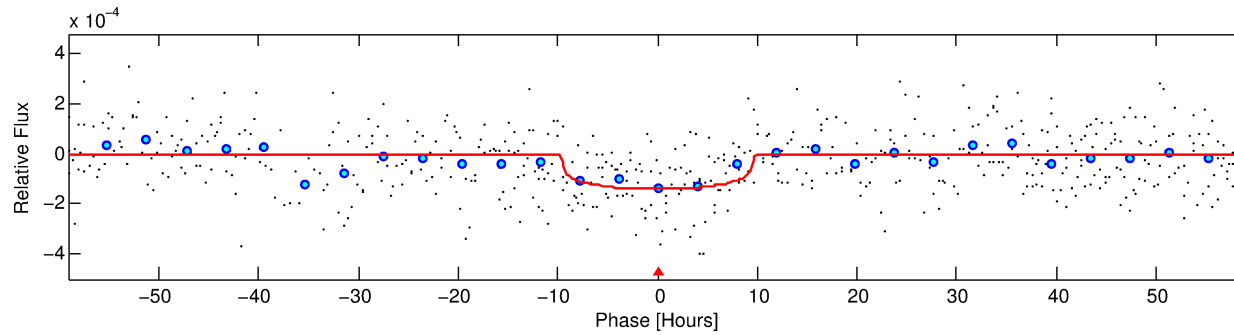
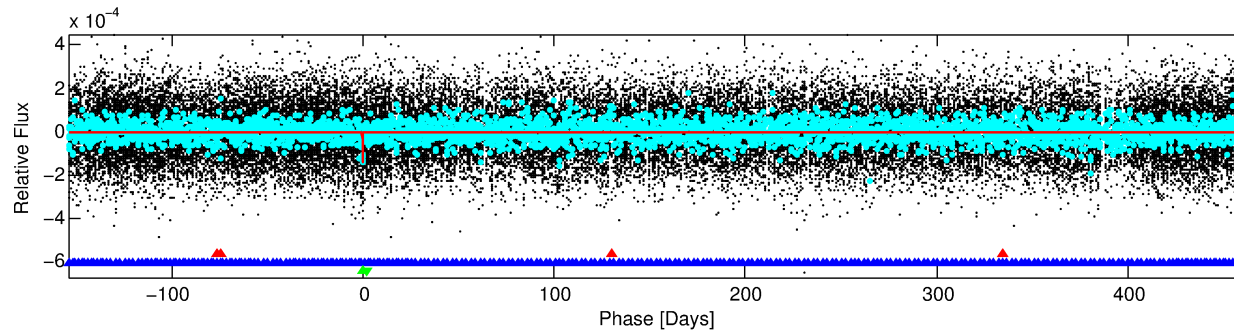
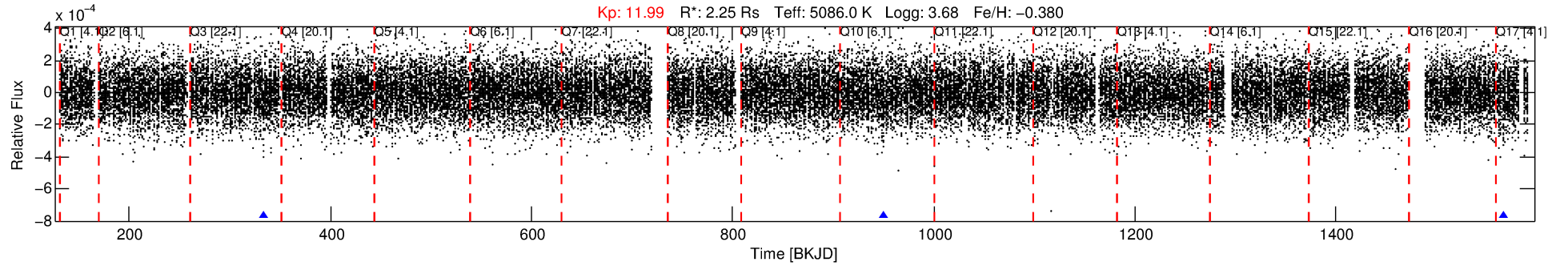
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004996057-03

No Significant Match Found

DV One-Page Summary

KIC: 4996057 Candidate: 3 of 3 Period: 616.236 d



DV Fit Results:

Period = 616.23579 [0.01963] d
Epoch = 334.1595 [0.0265] BKJD
Rp/R* = 0.0123 [0.0038]
a/R* = 139.85 [169.19]
b = 0.83 [0.47]
Seff = 1.64 [0.68]
Teq = 289 [30] K
Rp = 3.02 [1.43] Re
a = 1.3571 [0.3902] AU
Ag = 5963.83 [5389.62] [1.11 σ]
Teffp = 3923 [801] K [4.53 σ]

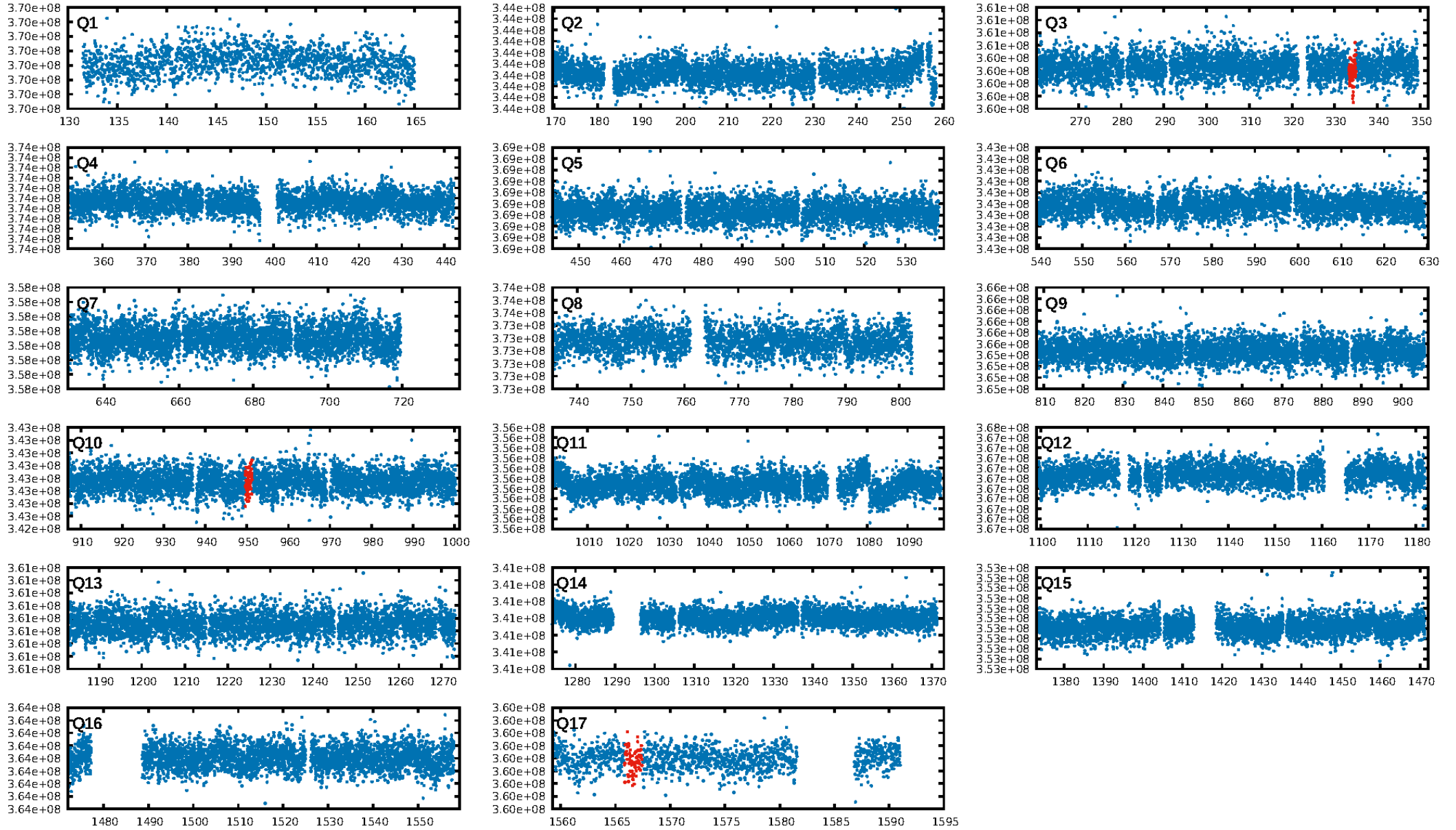
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [219.98 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.2%
ModelChiSquareGof-sig: 98.5%
Bootstrap-pfa: 3.86e-15
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 2.249
Centroid-sig: 24.5%
Centroid-so: 1.407 arcsec [1.48 σ]
OotOffset-rm: 2.688 arcsec [1.72 σ]
KicOffset-rm: 3.069 arcsec [2.19 σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 0.33 [1/3]

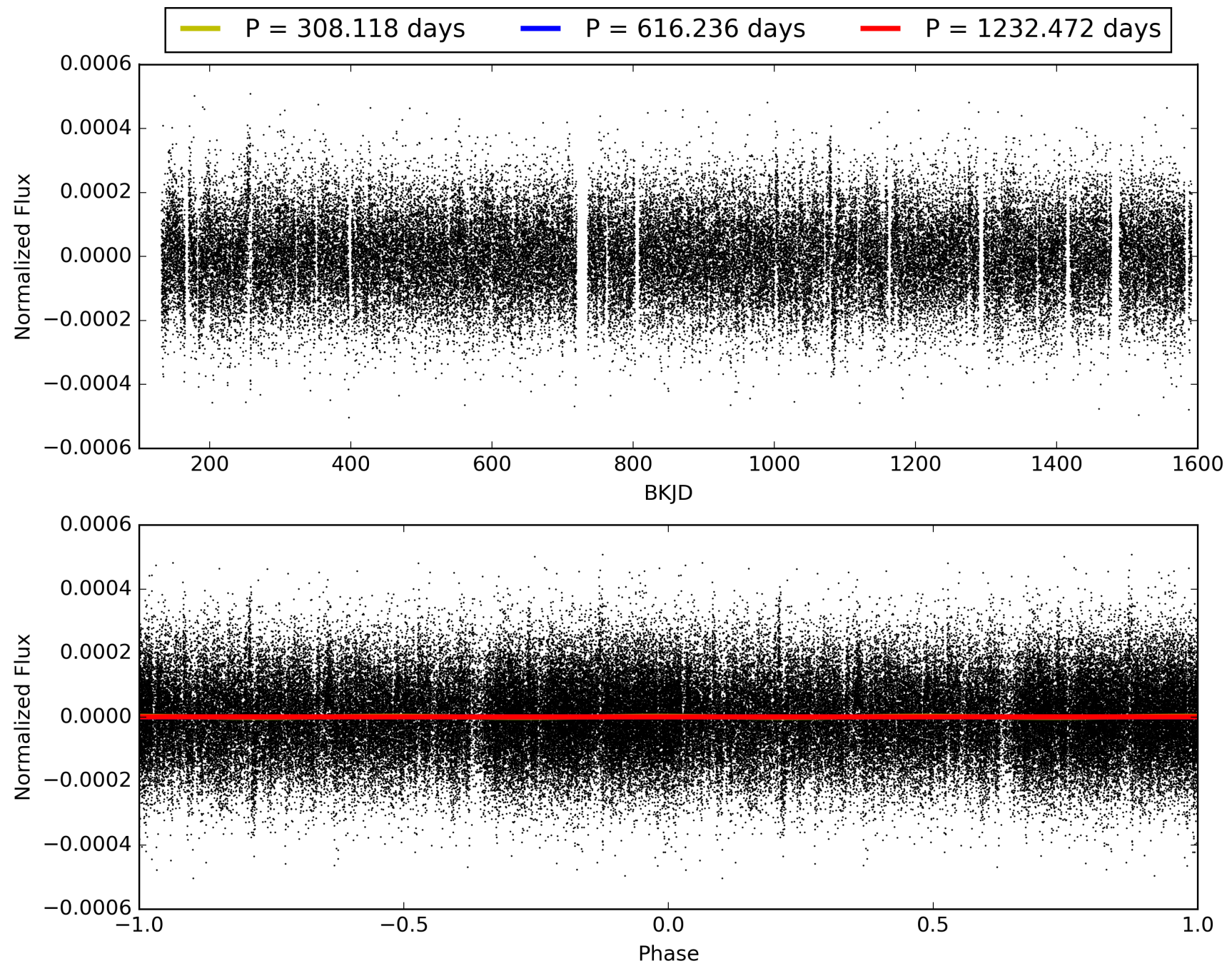
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:22:43 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004996057-03, PDC Light Curves

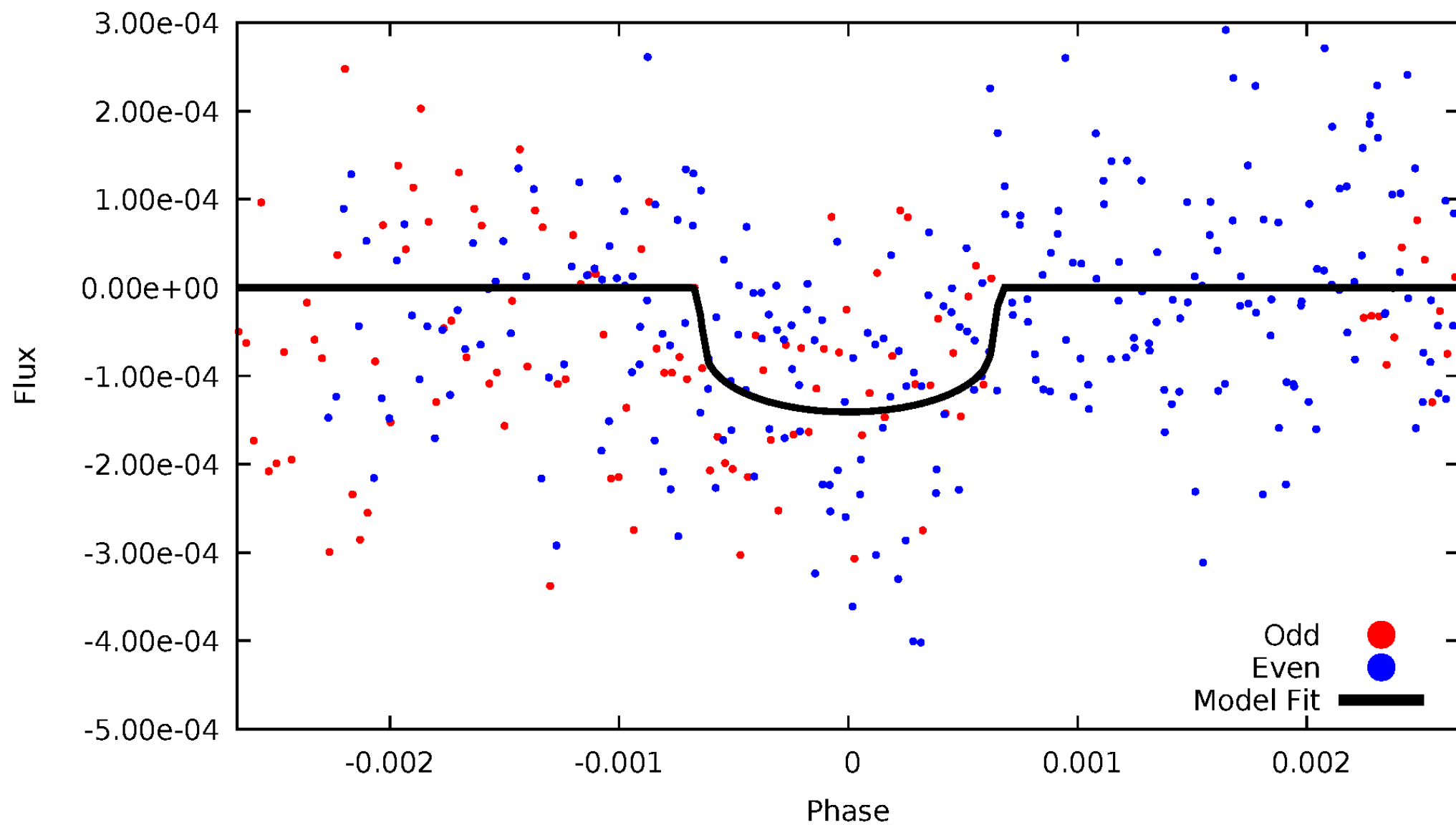


TCE 004996057-03



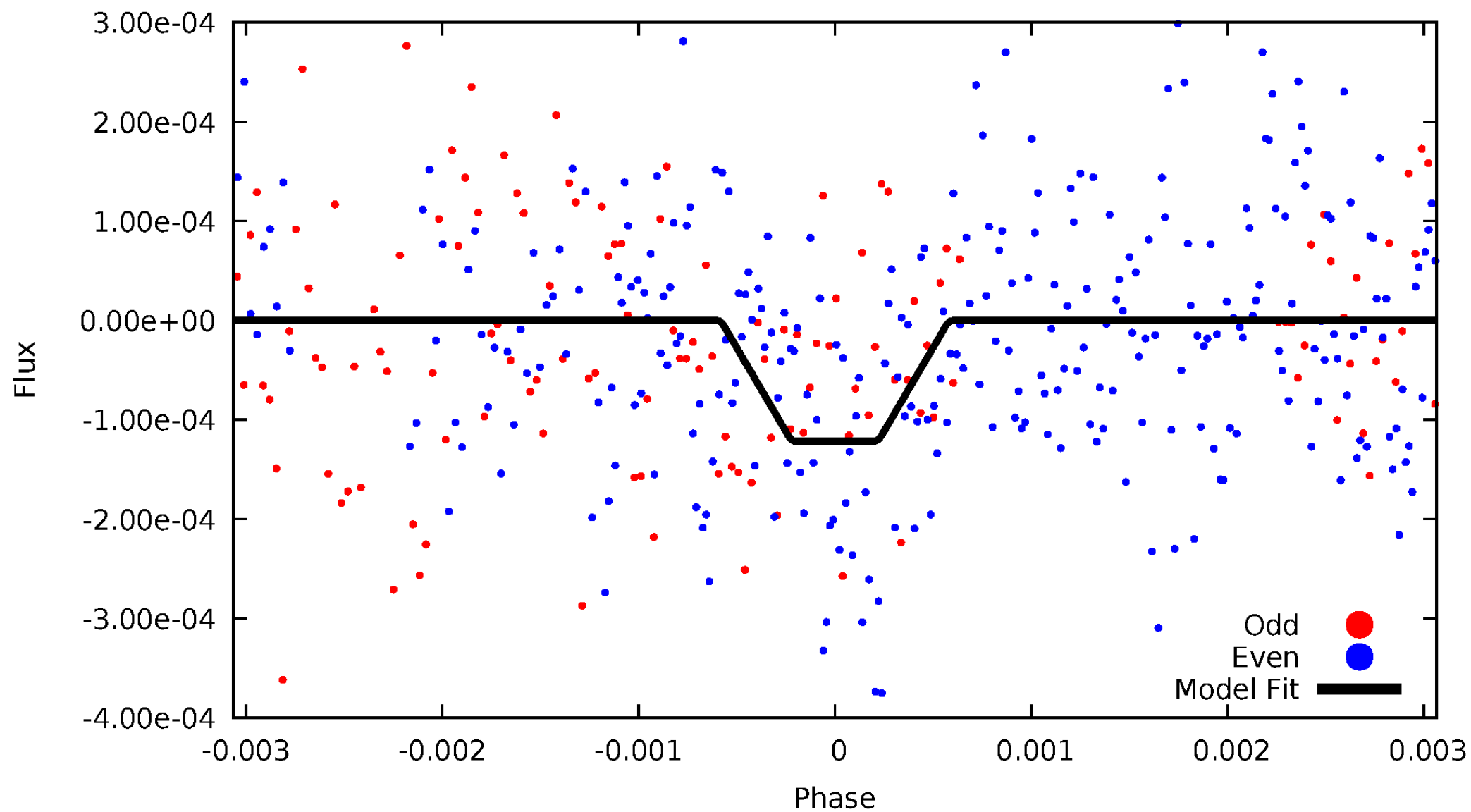
DV Odd/Even

TCE 004996057-03



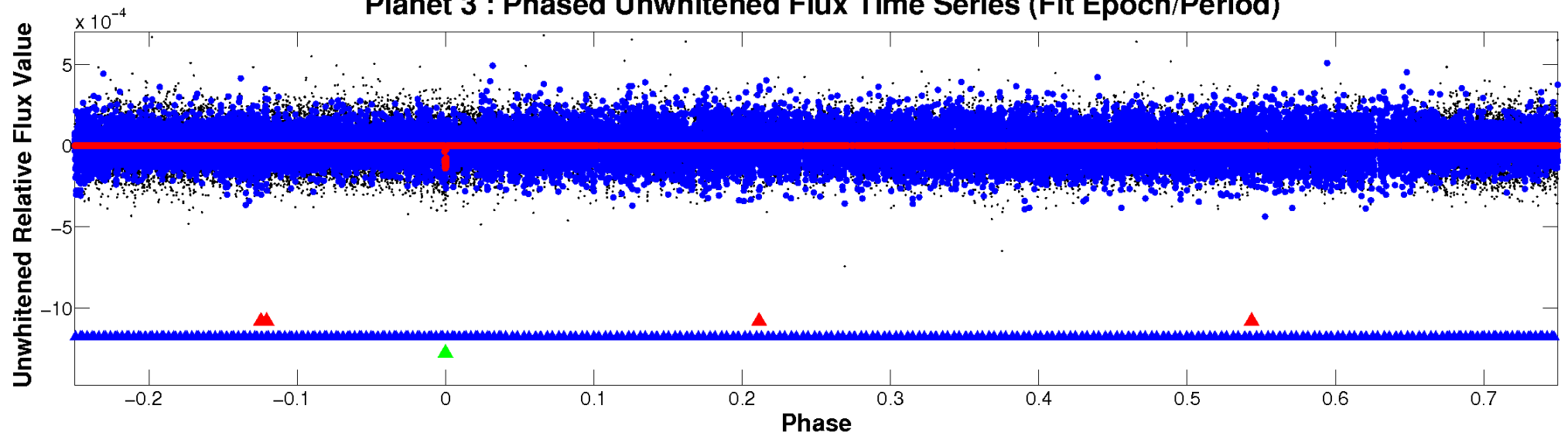
ALT Odd/Even

TCE 004996057-03

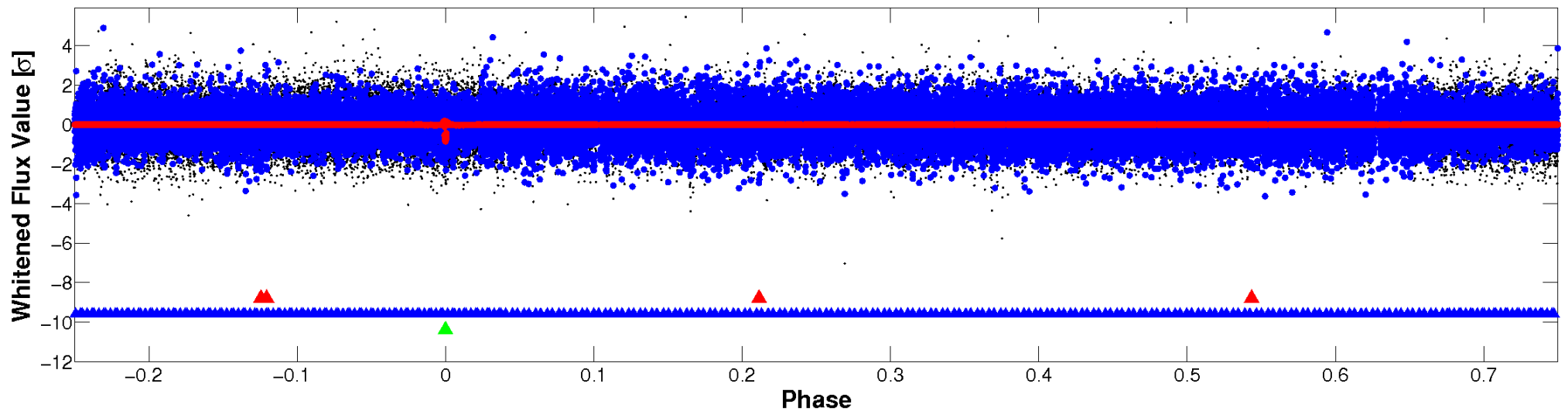


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



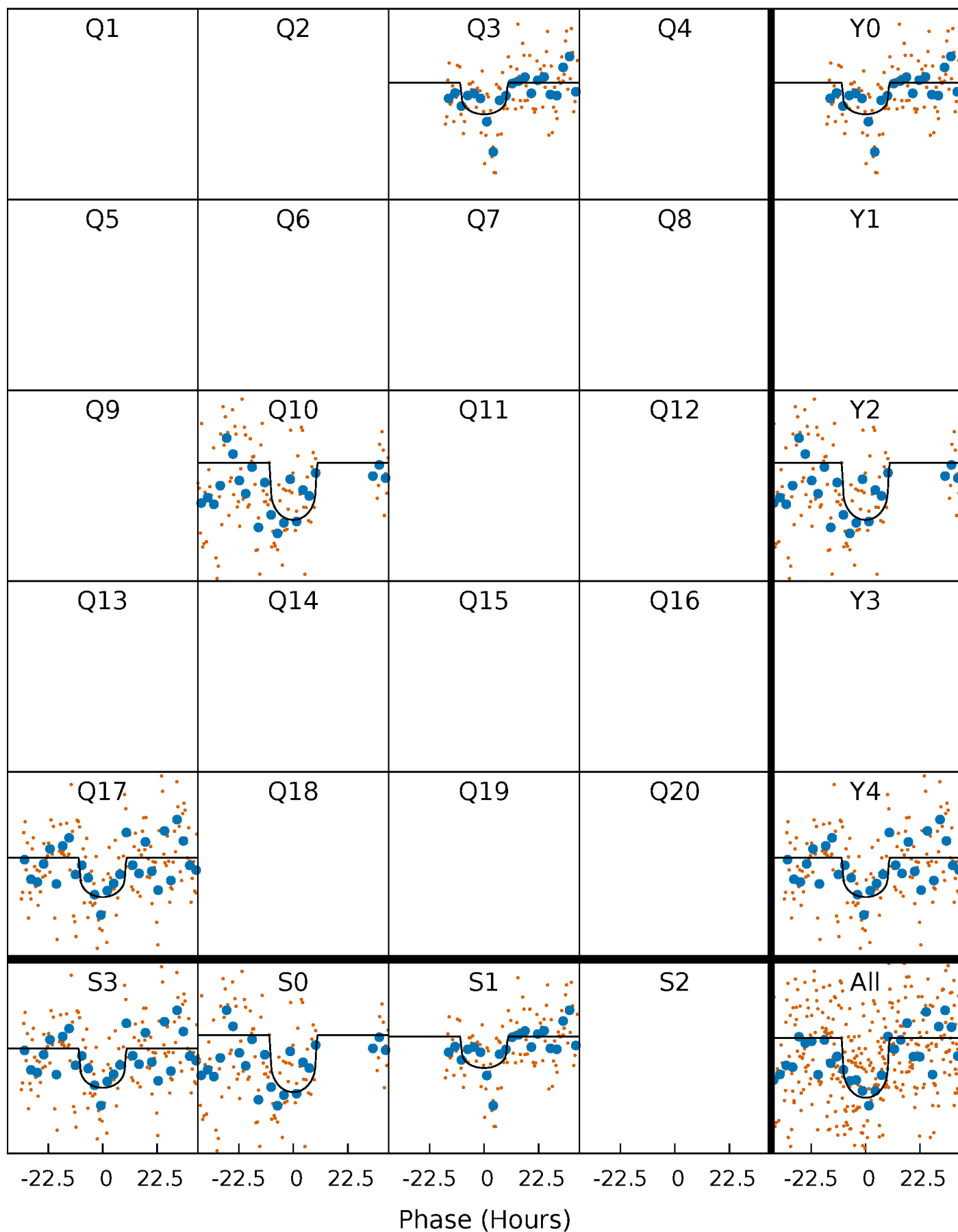
PDC Quarter-Phased Transit Curves

TCE 004996057-03 P=616.235786 Days $T_0=334.159499$ (BKJD)



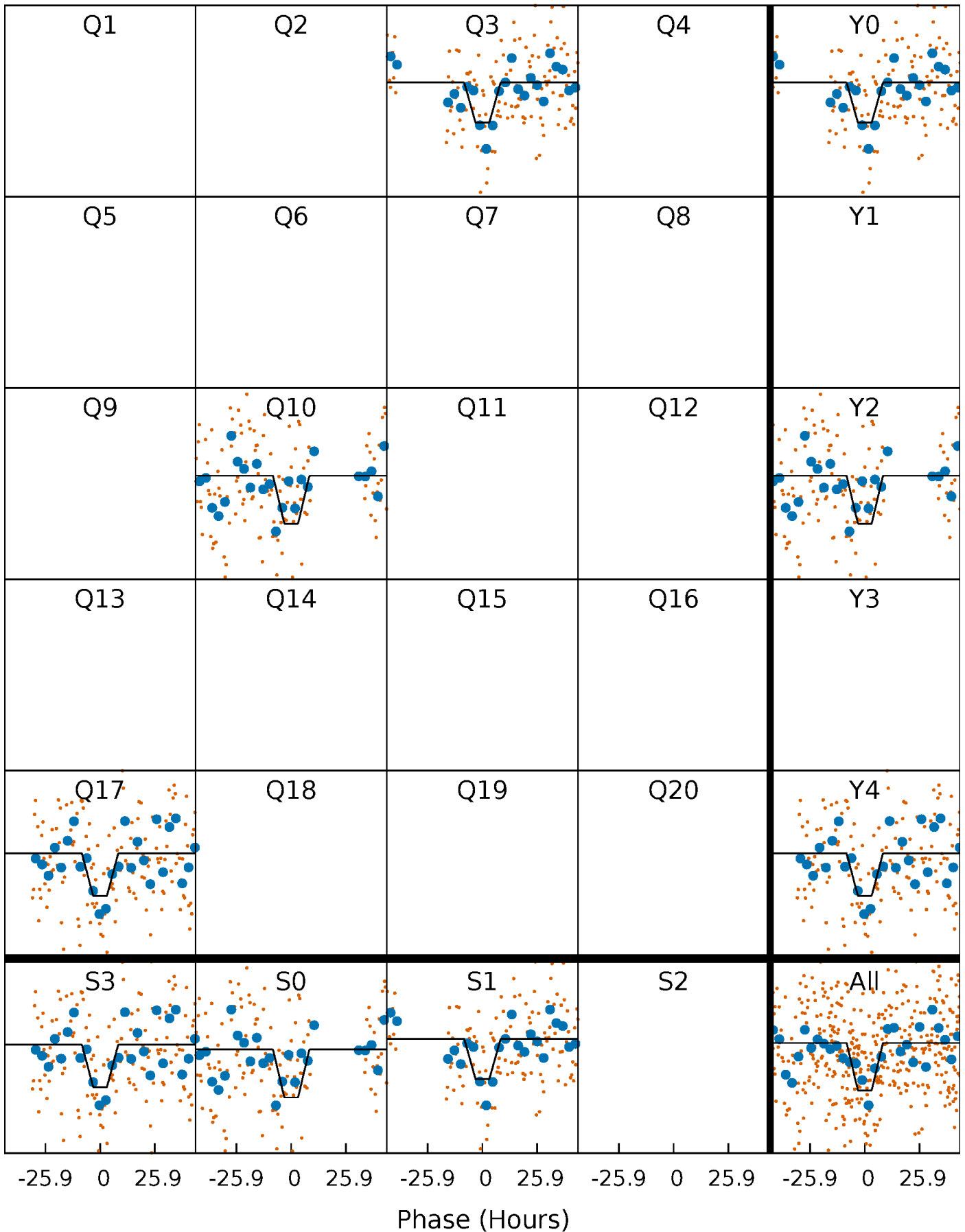
DV Quarter-Phased Transit Curves

TCE 004996057-03 $P=616.235786$ Days $T_0=334.159499$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

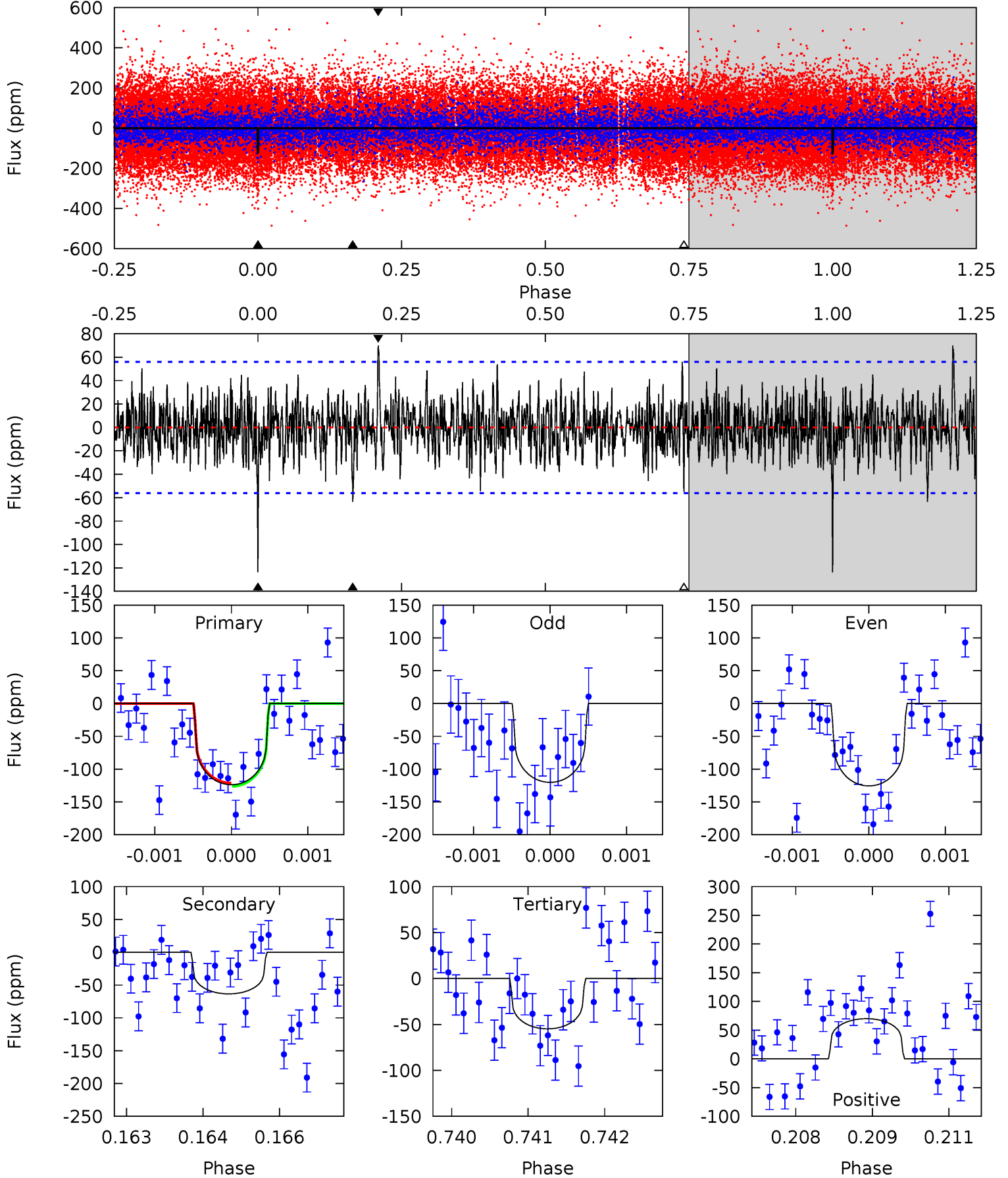
TCE 004996057-03 P=616.180813 Days $T_0=334.206640$ (BKJD)



DV Model-Shift Uniqueness Test

004996057-03, P = 616.235786 Days, E = 334.159499 Days

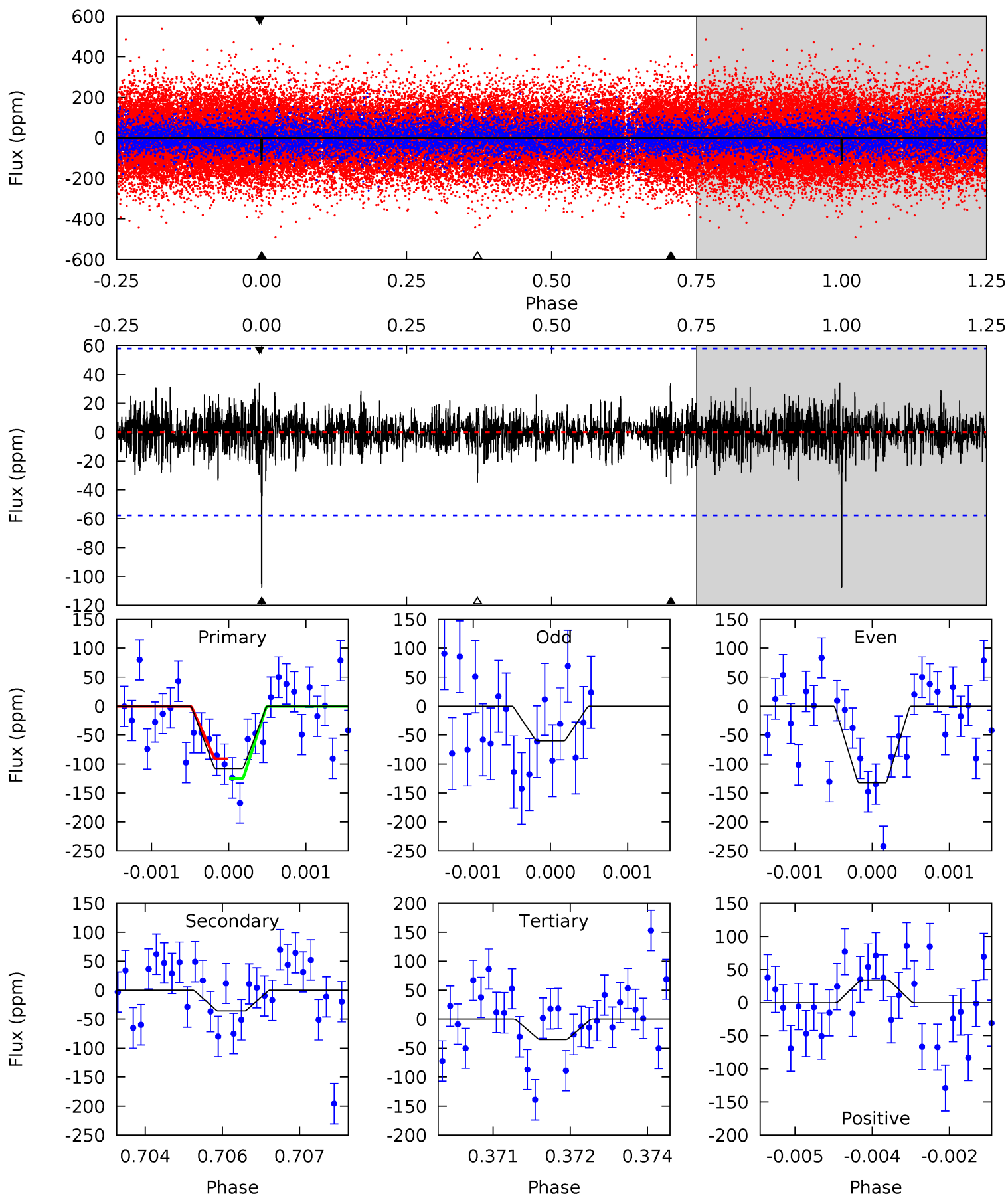
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.9	6.10	5.27	6.73	5.40	3.20	1.61	6.63	5.17	0.83	-0.63	0.25	1.03	0.36	0.23



Alt Model-Shift Uniqueness Test

004996057-03, P = 616.180813 Days, E = 334.206640 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	3.37	3.27	3.20	5.42	3.24	0.85	6.85	6.92	0.10	0.17	3.18	0.82	0.24	1.60



Stellar Parameters For KIC 004996057

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5086^{+129}_{-103}	$3.678^{+0.128}_{-0.208}$	$-0.380^{+0.300}_{-0.150}$	$2.247^{+0.806}_{-0.269}$	$0.877^{+0.258}_{-0.030}$	$0.109^{+0.055}_{-0.057}$
	+3%/-2%	+3%/-6%	+79%/-39%	+36%/-12%	+29%/-3%	+50%/-53%
Source	PHO1	FLK73	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 004996057-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-63 ± 10	$3.08^{+1.10}_{-0.96}$	407^{+36}_{-21}	4328^{+659}_{-427}	7029^{+7777}_{-3281}
Alt.	-36 ± 11	$2.82^{+1.07}_{-0.97}$	406^{+33}_{-21}	4016^{+670}_{-437}	4795^{+6047}_{-2537}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

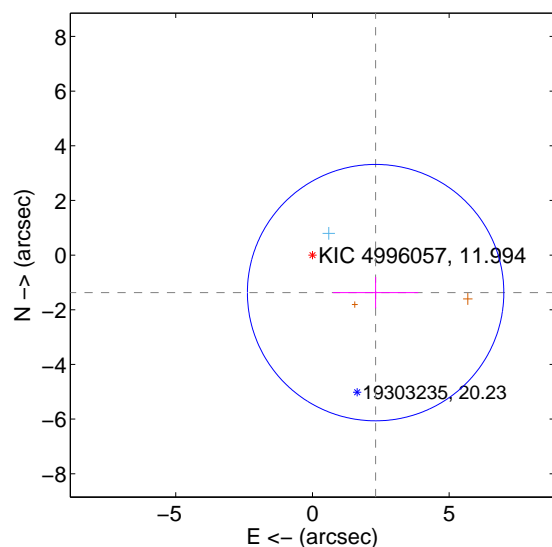
Supplemental centroid analysis for 004996057-03. **Kepler magnitude: 11.99.** Transit SNR 7.99

There are 1 quarters with good PRF difference image offsets

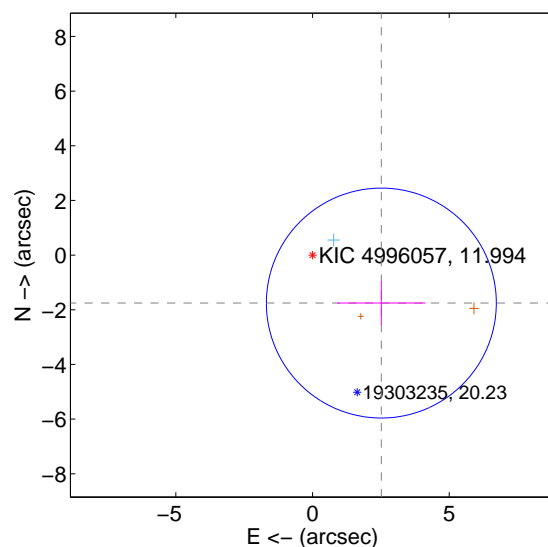
The direct PRF centroid is offset from the target star catalog position by about 0.48 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.688 ± 1.564	1.72	-2.311 ± 1.564	-1.373 ± 0.572
PRF-fit source offset from KIC position	3.069 ± 1.402	2.19	-2.518 ± 1.616	-1.755 ± 0.798
photometric centroid source offset	1.41 ± 0.95	1.48	-0.51 ± 0.80	-1.31 ± 0.97

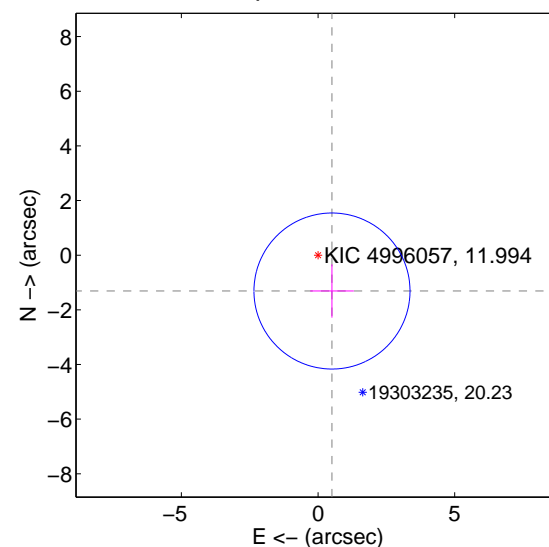
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

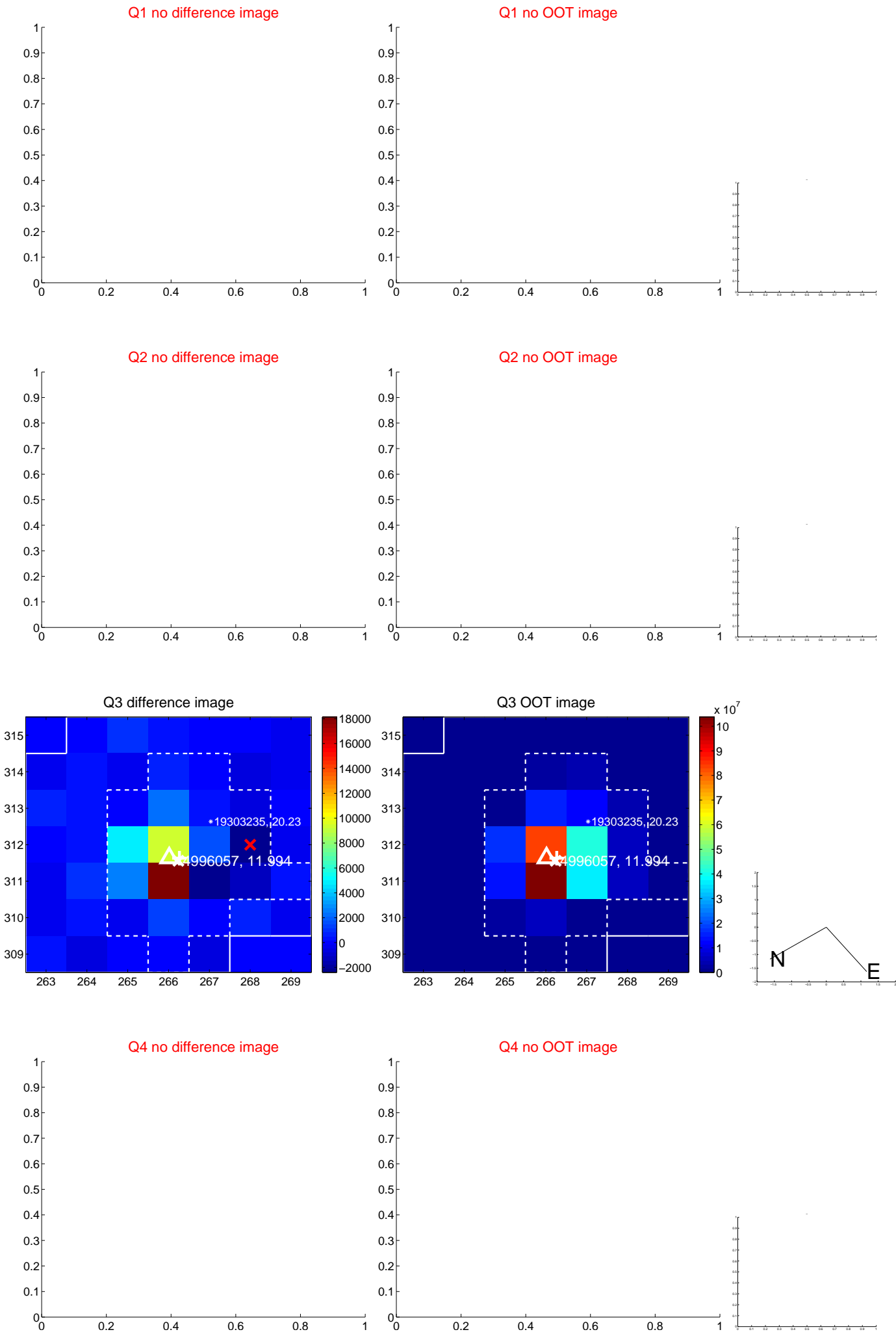


offset from photometric centroids



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

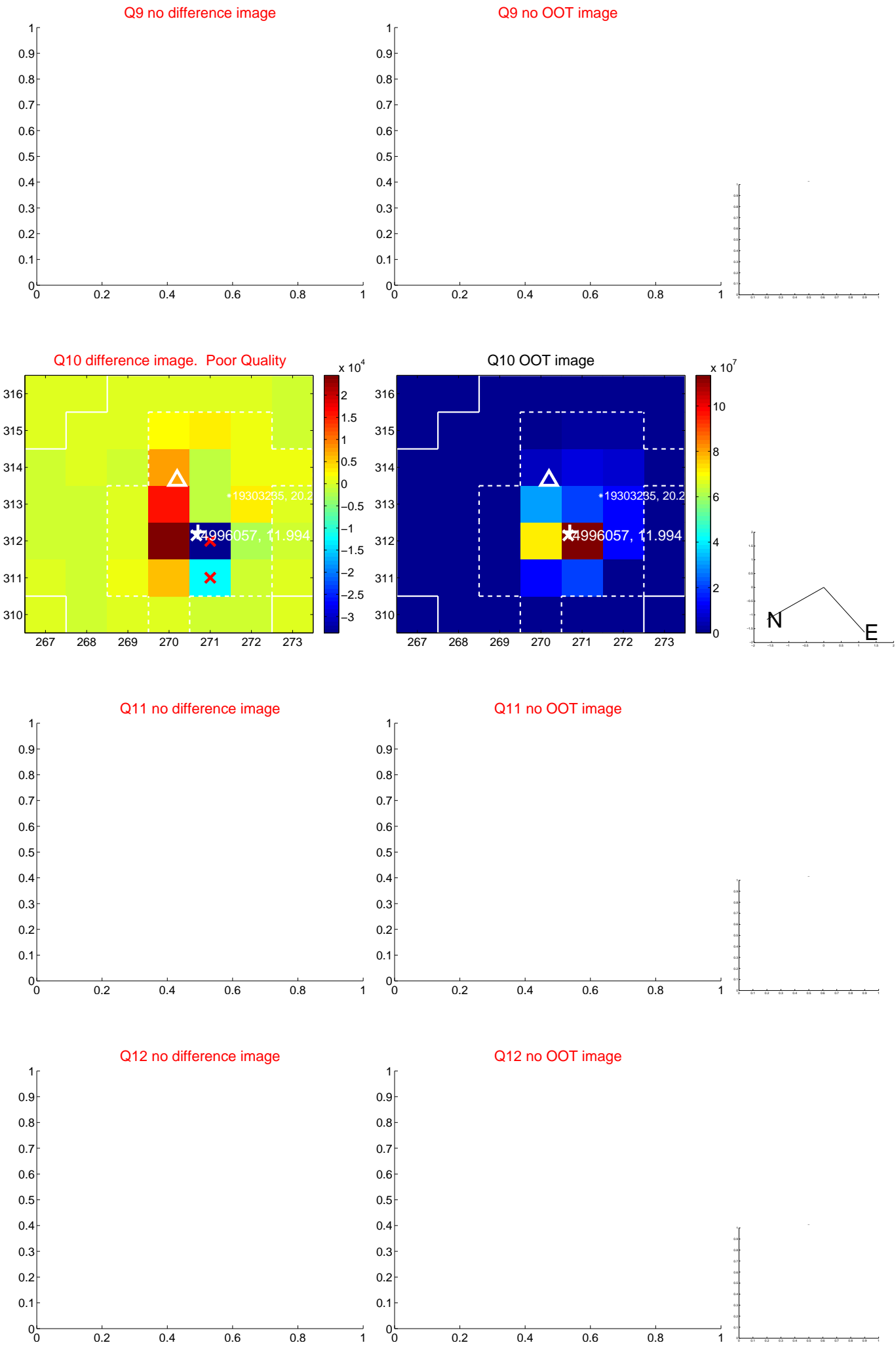
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



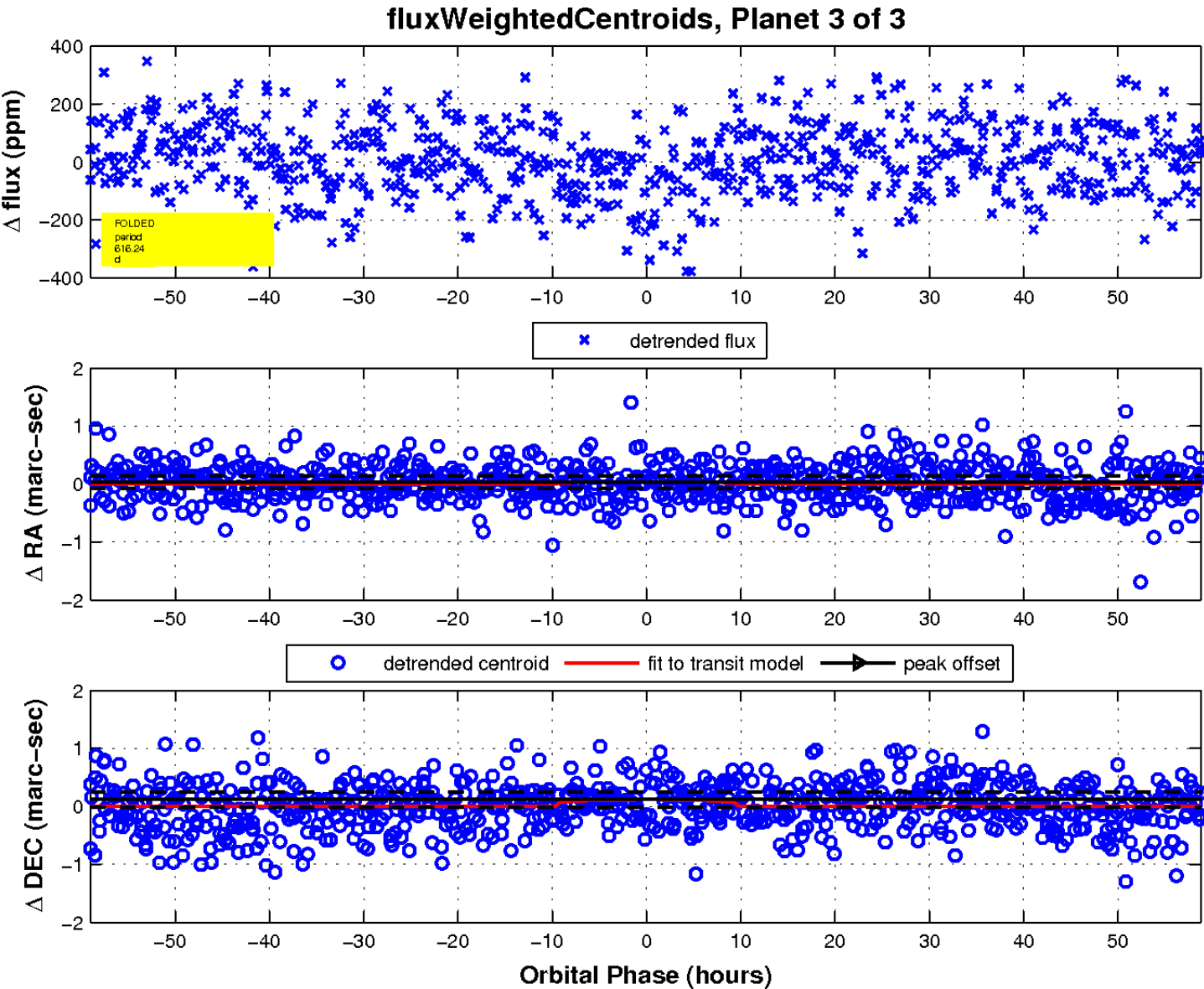
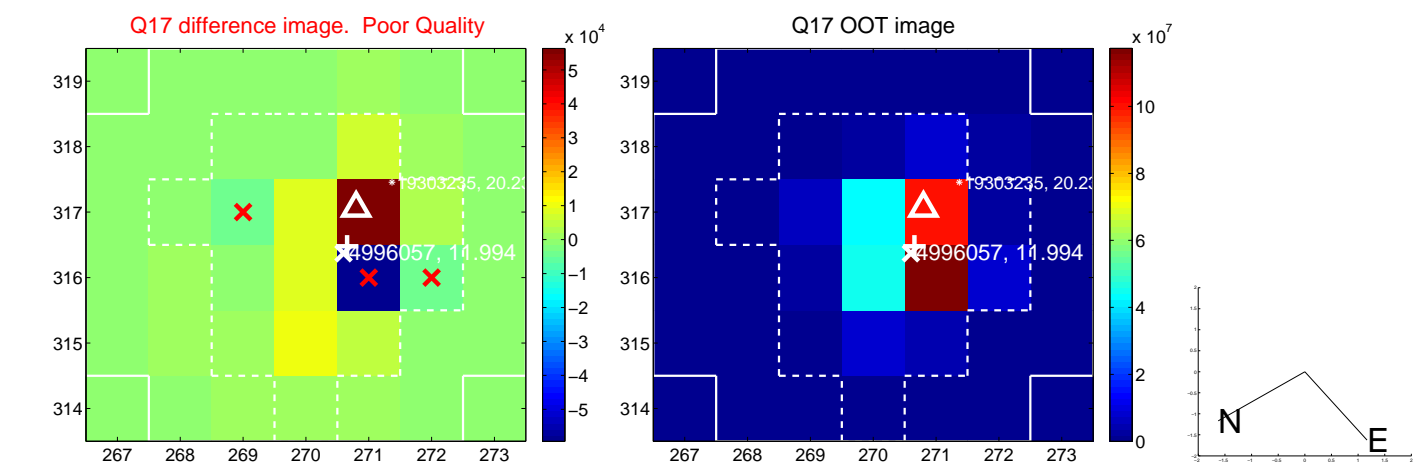
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

